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# Machine Tool Plant Keeps Separate Costs for Engineering Work

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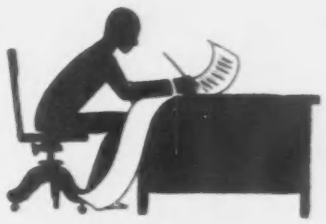
WHAT do you do in your plant with the cost of engineering work? Is it lost in the shuffle, applied as a burden to the entire business, or is it separately kept and applied to each individual job so that the engineering department is made to pay its own way?

In the plant of the author an estimate sheet has been devised for all engineering and development work, and total costs for such work are allocated to the costs of the products by the management. The benefits of this method are told in this article.

DURING recent months much has been written about the adequate accounting for costs of manufacturing and selling and distribution. Too little has been said about the cost of engineering activity, which in the last analysis is the heart of any manufacturing business. Without design, engineering research, development and the allied functions of an engineering department nothing could be prepared for the routine of the factory departments.

Of course, it is granted by everyone that there must be engineering departments, drafting rooms, experimental departments, demonstration floors and the like. We cannot dispense with them even under the most depressed conditions. But how about the cost of such departments and their respective activities? That is apparently another matter. I have seen organizations where every move made by the manufacturing and shop departments was accurately "costed" to the fraction of a penny; where costs of making every sale were tabulated with a most religious sanctity; yet the functions coming under the classification of "engineering" were passed up as being above control "or something."



When we stop to consider the importance of the designing and development work and its bearing upon the success or failure of a business it seems to me that this is the department where real conscientious cost work should start. After all, it is the department where all activity starts, for without design no products could be manufactured. It is the birthplace of the company's products, so to speak.

### Cost of Design and Development Work Must Be Considered

Design and development, without consideration of cost, are bound to prove fatal in the long run, as is being demonstrated every day by the rapid demise of many businesses manufacturing specialty products. All products must be designed, developed and demonstrated with a thought to their profitable manufacture and subsequent sale to the ultimate consumer at a profit. It is needless to say that without the profit no business can hope to last very long. Yet there are many cases where this very important point has been entirely overlooked, or at least not given the proper consideration from a cost standpoint.

It is within the function of every

cost department to consult with engineers and designers regarding the costs of production of any new product. A thorough cost accountant, trained in the operations of the particular business, should be given every opportunity to investigate the cost possibilities of every new design. He should be given the utmost cooperation of the engineers and the management to enable him to study the operations of manufacture, the materials used and the methods of labor in performing the necessary operations. The cost accountant who is on to his job usually has at his disposal data concerning time studies, manufacturing methods, and the comparative costs of various materials. These data should be used and consulted freely by the engineers and others concerned while working out problems concerning new products or changes in existing products.

This is a very important element in the successful manufacture of any product whether it be machines, glass bottles or clothing. But it is not this phase of engineering work which concerns me most, but rather the specific cost of performing the actual engineering work. This is the work that runs up to a considerable amount of money and that may in some cases entirely offset any profits derived from the actual manufacture and sale of the product itself. Let us see what some of the things are that will help to establish an adequate cost control over engineering activities.

### Engineering Department Should Be Separate and Distinct

First of all, the engineering department, drawing room, or whatever the title applied to the department performing such work may be, should be set up as a separate and distinct operating department, the same as the manufacturing departments in the factory. All expenses incurred by that department should be charged accordingly in an effort to ascertain the exact cost of performing all functions of that department.

All labor expended on the regular work of the department should be considered as direct labor and charged to the particular work being done on regularly approved orders, the same as manufacturing orders. Certainly, it is definitely known before any work is started just what is to be done and for what purpose. The theory has been constantly advanced that engineers are not "time clock punchers." I am sure that the engineer who is conscientious and working in harmony with the policies of management toward the objectives of the business will have no objection to keeping accurate records of the time he spends on each particular job. He need not necessarily be forced actually to punch a time clock; records of time are all that is necessary to accomplish the purpose, and there are many methods of keeping time records without the proverbial time clock.

I have said that all labor expended in this department should be direct labor. Certainly, all work performed in the department that is necessary to the functioning of the department is productive labor for that department. Then it should be recorded as direct. This includes such functions as designing new products, working up estimates and proposals for the sales department, making special designs on customers' orders, making drawings for the use of shop departments, blue prints, tools, jigs and fixtures, and even designing production machines for the use of the factory. All these are part of the regular work of the department.

Of course, there are certain classes of work in the department that may be classified as indirect, such as making copies of drawings for record purposes, filing, and other clerical activities porter work, messengers and the like. Needless to say, this labor should be considered as indirect and considered as part of the general burden or overhead of the department.

### Department Should Carry Its Own Part of General Expense

The regular expenses of the department consist of the usual building expenses such as depreciation, taxes, insurance and interest on the investment in buildings occupied by the department. If the department occupies only a portion of a building, these expenses should be allocated to the department on the basis of the actual floor space so occupied, actual repairs to the buildings or portion thereof in the proper ratio to total space. Heat and light used should also be charged to the department.

Equipment expense should also be charged in the same manner. This includes the power consumed by equipment in the department, repairs to equipment, and the depreciation, taxes, insurance and interest on the investment in the equipment.

Then, of course, there is the general expense of operating the department, consisting of supervision, clerical work, supplies, indirect labor as mentioned above, water, industrial compensation fees, based on the number of employees in the department, overtime pay, and a proportion of the general administrative expense of the business that is usually allocated on the basis of total output by hours to all departments.

It is recommended that elapsed time spent on the production orders issued to the engineering department be recorded on regular job time tickets in the same manner as the time is recorded in the shop, indicating thereon the order number, name and number of the part or machine being designed, account number to which charge is to be made and other pertinent information for the use of the cost and general accounting departments. These things should be reported at least as often as at the close of every pay period, so that proper control may be had of the cost of each job as the work progresses. It is extremely important that the accumulated cost be known, for it furnishes a guide not only to the person responsible for the economical operation of the engineering department but to the management as well, and in some cases to

the sales department. This is particularly true on special contract work, where excessive uncontrolled costs of engineering service may affect sales possibilities.

### Regular Burden Rate Should Be Applied on All Engineering Jobs

The cost department should establish a regular burden rate for the engineering department based on the expenses of that department, and apply it directly to the cost of each job. This is usually based on the productive hours, and I feel safe in saying that this is the recommended procedure of most accountants and consultants. If the productive hours on a certain engineering job are totaled as 100 hr. and the burden rate has been established at 70c. per productive hour, the total cost of burden on the job will be $70.

various elements entering into the development of a new product or any part thereof. Spaces are provided for design, drafting, patterns, core boxes, flasks, special tools, jigs and fixtures, and for the costs of experimental work and practical demonstration. On this sheet are entered the estimated costs of materials, labor and burden. These costs for labor and burden are based on the standard rates applying for the necessary classes of work. The total for each classification is derived by addition of all the elements of the cost of each class of work, material, labor and burden.

These estimate sheets are filed by the symbol numnumber of the part or machine called for on the estimate. They also indicate thereon the machine or other product where the unit is used or with what it is sold or used.

When the work called for is completed, the time

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**ESTIMATE sheet used by the Cincinnati Planer Co. on all development work, with columns showing items of estimated cost and actual cost.**

▼ ▼ ▼

USED ON

| PCS. | SYMBOL | PCS. | SYMBOL |
|---|---|---|---|
| 1 | 4738Y | | |

DEVELOPMENT COST

| | MATERIAL | ESTIMATED COST LABOR HOURS | LABOR RATE | LABOR AMOUNT | BURDEN RATE | BURDEN AMOUNT | TOTAL | ACTUAL COST ORDER | ACTUAL COST AMOUNT |
|---|---|---|---|---|---|---|---|---|---|
| ENGINEERING DESIGN | | 10.0 | 2.00 | 20.00 | .70 | 7.00 | 27.00 | S 327 | 30.00 |
| ENGINEERING DRAFTING | | 7.5 | .90 | 6.75 | .70 | 4.75 | 17.00 | S 327 | 11.75 |
| PATTERNS | 16.00 | 17.5 | .75 | 9.38 | 1.00 | 17.50 | 37.88 | S 328 | 41.10 |
| CORE BOXES | 2.00 | 1.5 | .70 | 1.05 | 1.00 | 1.50 | 4.55 | S 328 | 4.03 |
| SPECIAL FLASKS | 3.63 | 4.0 | .75 | 3.00 | 1.00 | 4.00 | 10.63 | S 328 | 9.78 |
| SPECIAL JIGS - DIES - FIXTURES - TOOLS | 40.00 | 38.7 | .85 | 32.90 | 1.35 | 52.74 | 125.64 | S 401 | 133.35 |
| EXPERIMENTAL | | 15.0 | 1.00 | 15.00 | 1.20 | 18.00 | 33.00 | D 4007 | 31.00 |
| DEMONSTRATION | | 2.0 | 1.00 | 2.00 | | | 2.00 | D 4007 | 4.50 |
| REMARKS TOTAL | 61.63 | 91.7 | | 90.08 | | 100.50 | 265.21 | | 265.51 |
| | | | | | | | | | 13.30 |

OPERATING - GAIN OR LOSS

CHARGE - SALES ORDER 4327 MFG. ORD. WITH 10

BALANCE OVER 390 AT 63 ¢ EACH

PART NAME SPINDLE SYMBOL 4738Y

It is important that the burden or overhead of the engineering department be absorbed by the work performed by that department and not considered as part of the general overhead of the factory, as has been the practice in a good many concerns in the past. It is no part of factory general overhead and should never be so considered. When it is so considered factory burden is overstated and incorrect costs of production are the result. Likewise, under such methods no true cost of engineering activity can be computed. Engineering work, as a rule, consumes a considerable amount of time, and, if true costs are not available, it is impossible to know what effect such work will have on the profit and loss account. And, after all, this account measures the success or failure of the business and the efficiency of the management.

The safest and surest method of obtaining effective control of engineering costs is to predetermine them, by setting a definite standard or bogey to shoot at, which may be based on previous estimates and actual past performances, combined with the best judgment of the business executives who are familiar with the work to be performed.

We have devised an "estimate sheet" for all engineering and development work. It is classified by the cards and material requisitions are figured and entered in totals opposite the estimated figures, thereby disclosing a definite comparison of the actual cost with the predetermined estimated cost.

This procedure is invaluable to a company using a so-called "standard cost" system as the estimated costs then become the standard and the difference between the standard and the actual becomes the "variation."

The total cost, as shown on the estimate sheet, may then be allocated to the cost of the products in any manner found advisable by the management, using the estimated cost standard and charging off to profit and loss account the variation, when a standard cost system is used, and allocating the actual cost figure when other systems are used.

This has a definite and distinct benefit in that it shows (as a part of the cost of every part or entire product) an item covering the proportionate cost of engineering and development of the part or product. These figures are invaluable for future reference, especially to the company that goes in for contract work and special machines. It is indispensable to the concern regularly manufacturing a definitely similar line of machines which must be constantly kept up to

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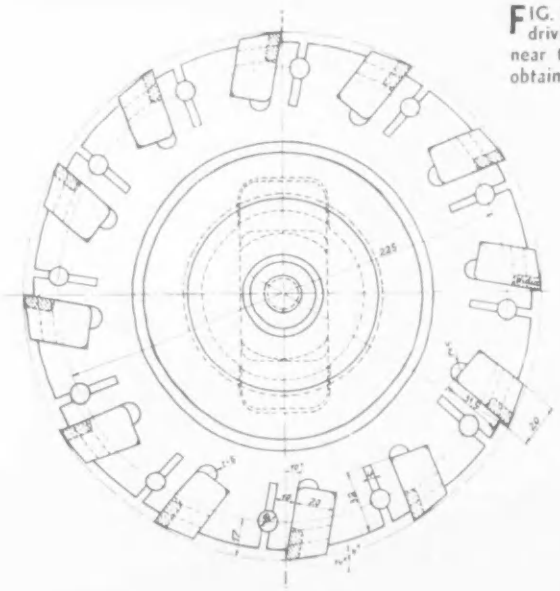
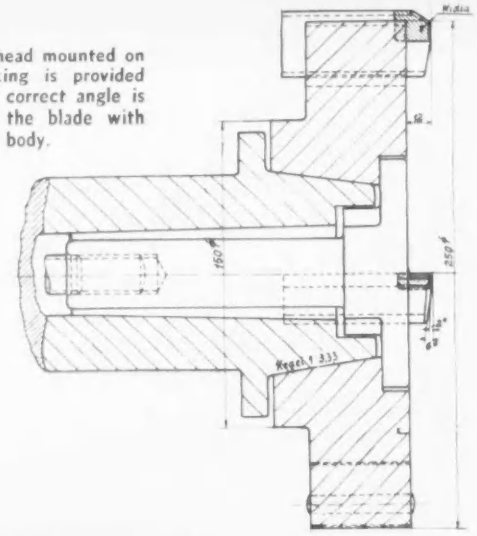


FIG. 2.—Inserted-blade cutter head mounted on driving spindle. Strong backing is provided near the cutting edges and the correct angle is obtained by proper placing of the blade with respect to the cutter body.



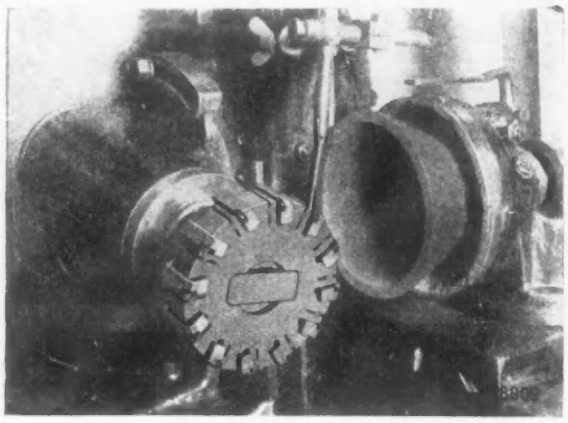


Fig. 4.—Grinding the outside diameter of a Widia-tipped inserted blade cutter.

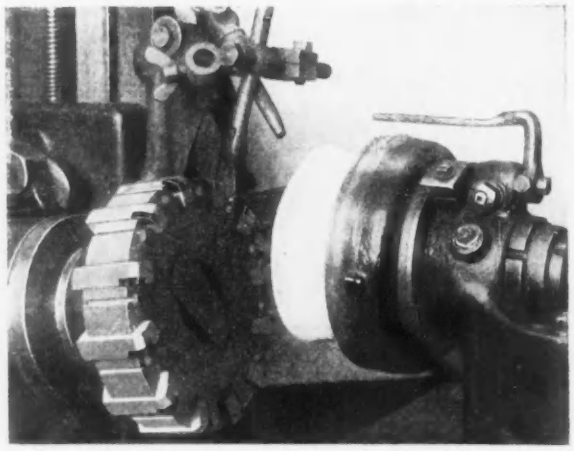
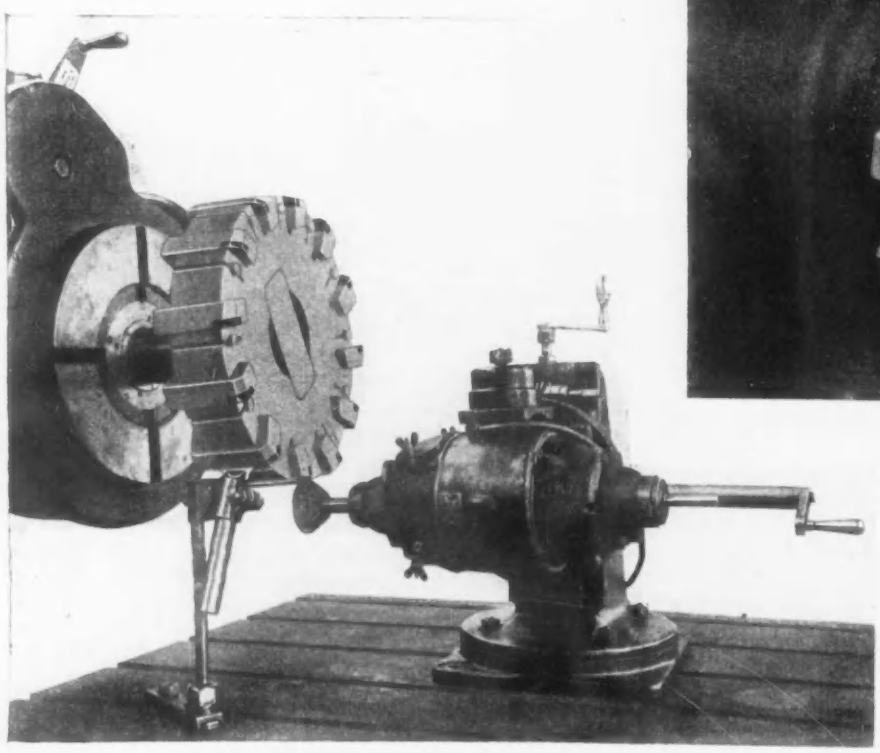


Fig. 5.—Grinding the face of the tungsten-carbide milling cutter.



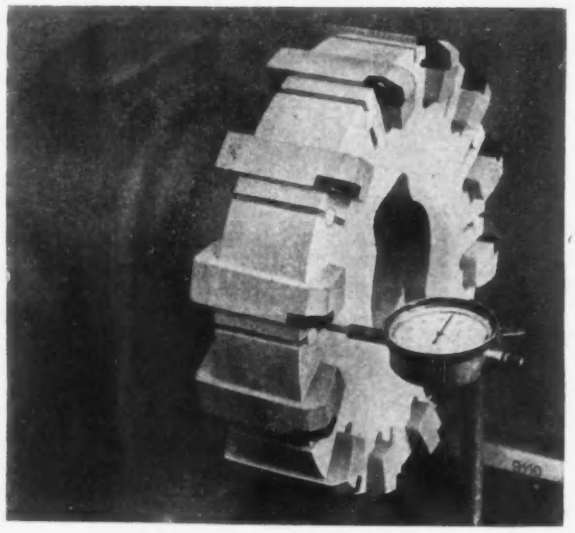


FIG. 3.—After the blades are roughed to approximate shape, the shanks are set up in the cutter head with the assistance of an indicator gage. (Above).

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Fig. 6.—(Left) Dull cutters may be resharpened by means of a portable grinder, the grinding being done without removing the cutter head from the machine.

# GRINDING TUNGSTEN-CARBIDE MILLING CUTTERS

**PROCEDURE in rough and finish grinding and in resharpening Widia-tipped inserted-blade milling cutters is outlined in this second article by Mr. Prosser. Some special small tools are also illustrated, and important points to be remembered in grinding tungsten-carbide tools of all types are summarized. The first article appeared in THE IRON AGE of Nov. 26, page 1357**

By ROGER D. PROSSER
Thomas Prosser & Son, New York,
American Representative of Friedrich Krupp, A. G., Essen, Germany

BLADES are rough ground free hand to approximate form before being mounted in cutter head.

IN general, milling cutters should be made with inserted blades, so that in case of damage to any one blade it can be removed and repaired without disturbing the other blades.

The cutter head should be especially designed for use with tungsten-carbide and should have strong backing as near as possible to the cutting edge. Also, the correct cutting angle should be obtained by proper placing of the cutter blade with respect to the cutter body, rather than by attempting to grind the angle on the blade itself. A suitable cutter is shown in Figs. 1 and 2. The angle between the radius of the cutter body and the top surface of the blade should be such that the cutting angle will be suitable for the particular material to be milled,

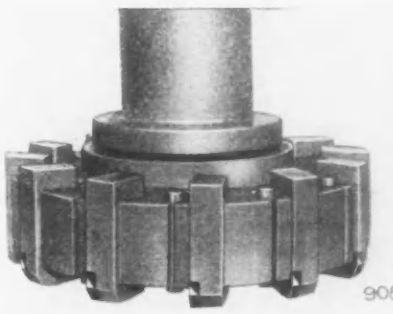


FIG. 1.—Milling cutter with Widia-tipped inserted blades. The tool was designed especially for tungsten carbide.

the same as specified for turning tools in the table in the previous article. [See page 1357 of THE IRON AGE of Nov. 26.]

The top surface of the inserted blade shank should be rough ground to within about 0.01 in. of the surface of the tungsten-carbide tip, using an ordinary grinding wheel suitable for grinding steel. The top surface of the shank and the Widia tip are then ground together by means of a special wheel. In this way it is possible to avoid to a considerable extent the loading up of the wheel with the soft-shank material and consequent loss of cutting efficiency, which results in excessive heating of the Widia tips and consequent danger of strain cracks.

After finish grinding the top surface, the remaining surfaces of the shank are surface ground to the desired dimensions with an ordinary grinding wheel. Through the above procedure and the construction of the cutter head, the entire grinding process is greatly simplified.

Before insertion into the cutter head, the form of each blade is roughed out free-hand to the approximate shape desired, as shown in the illustration at the top of this page. The shanks are then set up in the cutter head with the assistance of an indicator gage, as shown in Fig. 3. Finally the complete cutter head is finish-ground on any of the first class rigid milling cutter grinding machines available,

using a suitable special wheel and being careful that only a very light grinding pressure is employed. Grinding of the outside diameter and the face is shown in Figs. 4 and 5, respectively.

Resharpening of cutters which have become dull is accomplished in a similar manner; for a light regrinding even a portable grinder may be employed, so that the work can be done without removing the cutter head from the milling machine, as in Fig. 6. For regrinding, cup or dish wheels of the special grade should be used and their diameter should be governed by the size and arrangement of the blades. Grit, grain and grade of the wheel are determined by the finish which the cutter must produce on the work.

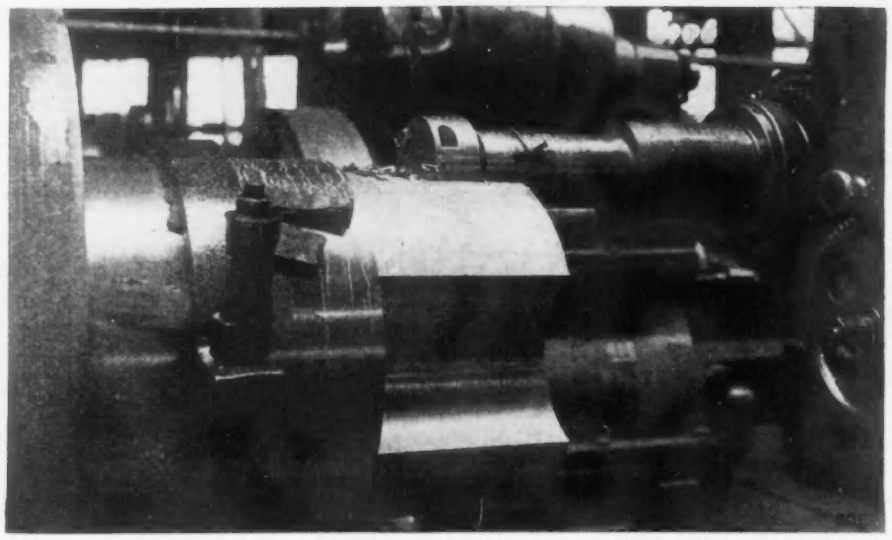

Fig. 7.—Milling the wobblers of a chilled cast iron roll with a cutter having tungsten-carbide tipped blades.

There will naturally be somewhat greater wear of the wheel than in the case of grinding high-speed steel cutters, due to the comparatively soft bond of the wheel, but this can be overcome to a considerable extent by the use of wheels with thick walls. Cup wheels with twice the ordinary wall thickness should be employed, and this will also result in more accurate grinding of the cutter.

If a single blade is badly damaged in use, it should be removed and the preliminary grinding to the required form should be done by hand, after which it may again be inserted in the cutter body, using an indicator gage as before; then only a light finish grinding of the head is necessary, to insure true running and equal depth of cut for each blade. The grinding down of all the blades to make them even with the damaged one should not be attempted; such procedure would result in unnecessary grinding cost and loss of tungsten-carbide.

The cost of grinding Widia tungsten-carbide cutters will, of course, be somewhat higher than in the case of grinding high-speed steel cutters, due to the wheel-wear, which necessitates the separate grinding of each tooth. With a little practice and experience, however, a cutter can be ground in very little more time than is required for high-speed steel cutters, and the increased resistance to abrasion of Widia tungsten-carbide results in a much longer tool life between grinds, and, of course, permits of greatly increased cutting speeds.

### Grinding Special Tools

End mills, saws, boring tools, twist drills, reamers, etc., are sharpened on universal tool grinding machines, the same as in ordinary practice, but, of course, the special grinding wheels must be used, and the machine and fixture should be as rigid as possible to avoid springing of the work away from the wheel. Extra care should also be taken when grinding, to be sure that only very light grinding pressure is used.

Special tools employed for coal mining and similar purposes, as shown in Fig. 8, may likewise be ground on the special wheels.

When grinding tungsten-carbide tools the following points should always be borne in mind:

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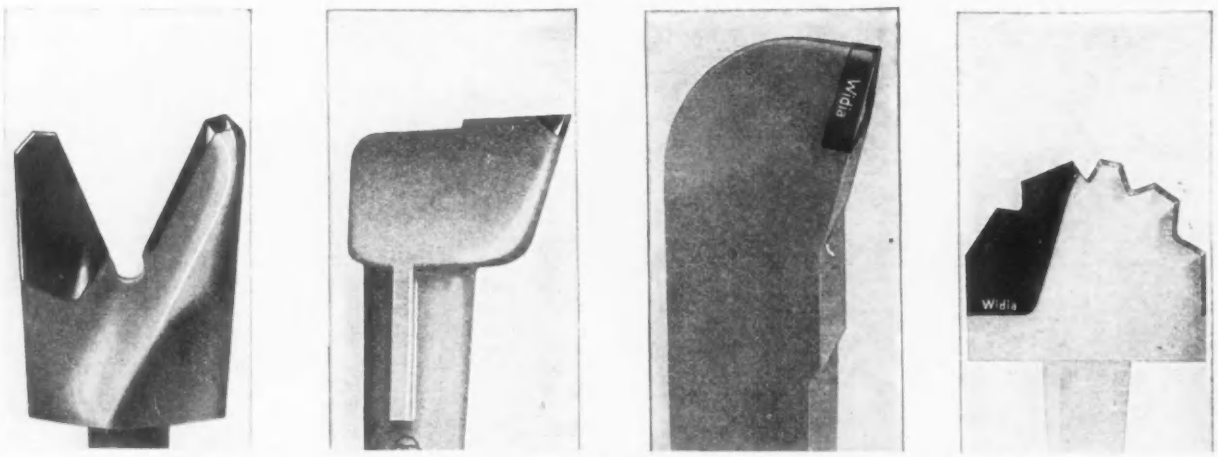
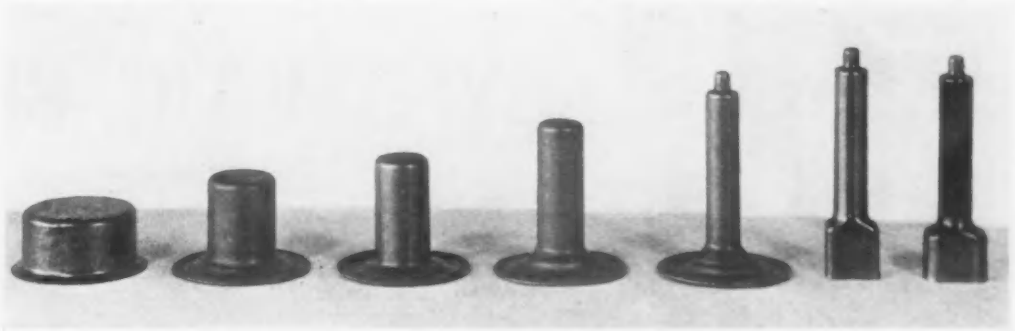



Fig. 8.—From left to right, these Widia-tipped special tools are: Coal drill; two picks for coal cutting machines; and a special drill devised for stone and potash.

Different stages in drawing a tubular steel spoke. ▲▲▲



# DEEP-DRAWING A TUBULAR STEEL SPOKE

By E. H. ARNOLD
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CONSTRUCTION of automobile wheels has been given a great deal of consideration for a number of years and various new types of wheels have been brought out. Artillery-type wheels have been replaced by or duplicated in steel to only a very limited extent up to the present time. While wheels have been made with steel tubular spokes such as a locked seam spoke and a spoke made from two halves and welded, the author has never seen a steel spoke made in one piece without welding or seaming except the one referred to in this article and for the manufacture of which several patents have been issued. A tubular steel spoke wheel some day may be commercialized and used for standard equipment, but this presumably will be a matter for the wheel manufacturers to decide together with the automobile manufacturers.

While many of the readers of this article may not be interested in any kind of a steel spoke, it is believed that the method described of making the spoke may be of interest, especially to those who have experienced and have been up against difficult deep drawing problems. This article is being written especially from an educational standpoint to show not only what has been done, but what can be done with steel in producing a tubular steel spoke.

Often it simplifies matters for the engineer or stamping expert when he knows what has been actually accomplished with a piece of steel, especially when it has been subjected to a number of redrawing operations. The information also helps to establish a fact—the fact of what can be done with or what may be expected from a piece of steel. In making tubular steel spokes the author did not use special-analysis or dead soft, deep-drawing quality steel. The steel that was used for this purpose was common, ordinary soft cold-rolled steel. What was accomplished in using ordinary sheet steel instead of material of deep-drawing quality may be of interest to the metallurgist and the steel man.

The one-piece, seamless, hollow-drawn metal spoke is in dimensions virtually a duplicate of the wood

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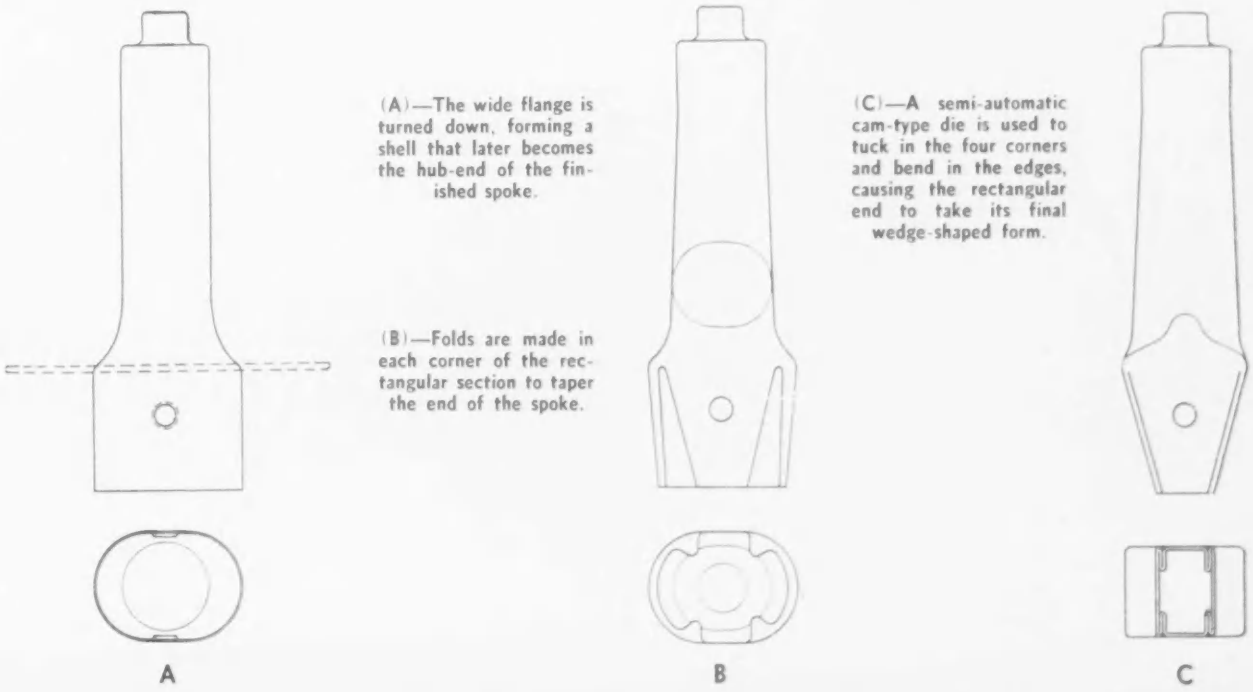
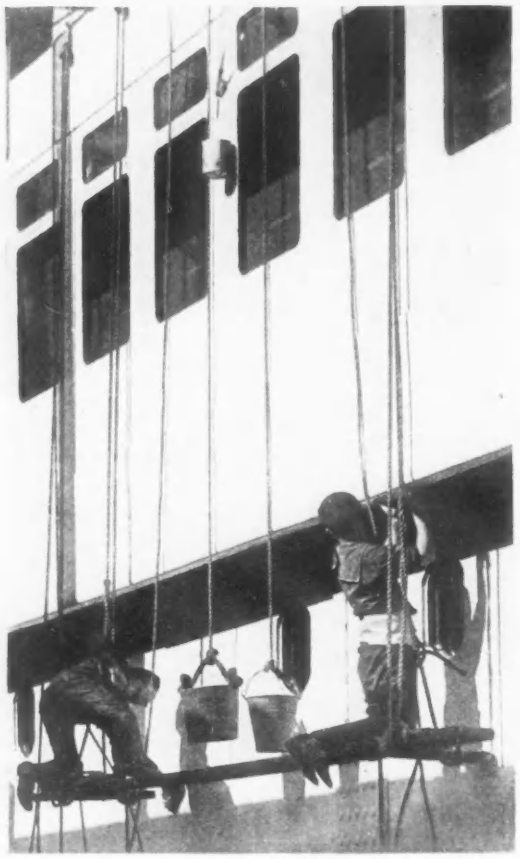


(A)—The wide flange is turned down, forming a shell that later becomes the hub-end of the finished spoke.

(B)—Folds are made in each corner of the rectangular section to taper the end of the spoke.

(C)—A semi-automatic cam-type die is used to tuck in the four corners and bend in the edges, causing the rectangular end to take its final wedge-shaped form.

A B C



# SYNTHETIC RESINS ENAMELS FOR

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**DEMAND from metal products' manufacturers for colorful and durable finishes is broadening into new fields of metal consumption, and the adoption of rustless steels for decorative purposes has intensified the search for colorful enamels on ordinary steel to set off the gleaming silver of this alloy.**

**In response to this demand, the laboratories of the paint and enamel manufacturers, aided by the elasticity and toughness available in synthetic resins, are producing a variety of baked and air-drying metal finishes, notable for durability and colorful effects.**

▼ ▼ ▼

USE of steel for utensils and cabinets in the home, for furniture, office equipment, interior decoration in stores and buildings and for railroad passenger coaches and automobiles has been accompanied by a demand for durable, corrosion-resistant coatings. And this demand has been expanded to include improvement in the appearance of the products, as a means of increasing salability. Also the field of architectural applications has been broadened by the development of metal-walled buildings, and by the use of enamels to contrast with rustless steel for interior decorations. And the coatings have become available for cast as well as rolled products.

This steadily growing demand from the metal products industries, coupled with the growth of numerous lacquer finishes, has stimulated the paint and varnish manufacturers to seek improved enamels that will meet the severe requirements of finishes on metal, whether stamped from sheets by the thousands, or for the specific tonnage installation.

As the demand for such metal finishes has developed, durability and elasticity have been sought, features not fully available in the coatings compounded with bases of natural resins. For years ester gum, a glycerine-treated rosin, brought to enamels and varnishes much of the durability and resistance to heat and water that was needed, but finally, a product of the laboratory, synthetic phenolic resins, began to be used by the manufacturers of enamels; and with these resins as a constituent, instead of fossil gums, the extreme resistance to mild acids and caustics, and the great elasticity and toughness of finish that had been sought began to be attained.

Recently, a builder erecting a large hotel in Florida approached Edward Smith & Co., Long Island City, N. Y., seeking a priming coat for metal window frames which would adequately withstand the action of salt air for a year, or until the hotel was entirely completed, when the windows could be painted with a finishing coat. As a result, a long-oil priming coat containing synthetic resin was compounded, and samples of metal were dipped and subjected to a 72-hr. salt spray test, which they withstood successfully.

This same manufacturer had occasion to remove a baked enamel finish containing Bakelite from certain steel plates. The plates were boiled in a 50 per cent caustic solution for 1 hr. with the result that, although the enamel was completely removed by the treatment, it remained as a practically unbroken film, floating in the solution. An ordinary enamel, according to this manufacturer, would have scaled off and partly dissolved.

For motor cars, and for the interior finish of railroad passenger coaches, or elevator cars, a strong, durable, glossy finish is required. Automobile manufacturers have recently tried synthetic resin undercoating on body work, as a means of securing a strong, elastic foundation for the lacquer finish of the body. While lacquer is used generally for body finishes, many builders use baked enamel on the fenders, which are

# PROVIDE DURABLE, COLORFUL METAL PRODUCTS

By GEORGE S. HERRICK

likely to meet with hard usage. On the interior finish of railroad passenger coaches and for elevator cars, the synthetic resin finishes have been found capable of withstanding considerable cleaning and polishing.

### More Air-Drying Finishes Used

A manufacturer of washing machines has recently adopted a synthetic resin, air-drying enamel to finish his product, because of increased resistance to alkali. Immersion tests of these coatings, made by the Bakelite Corpn., New York, one of the largest manufacturers of a group of synthetic resins, indicate that they are unaffected by 1 per cent solutions of caustics for hundreds of hours and will withstand up to a 5 per cent solution for 12 hr. or more. In consequence, not only for such products as washing machines, but in protecting surfaces which require repeated washing and polishing, they afford a finish highly resistant to the effects of soap and cleaning compounds.

Recently the Hilo Varnish Mfg. Co., Brooklyn, has developed an enamel known as "Syntol," provided in a wide range of colors. A single coating of this enamel on steel gives an elastic, closely adhering surface, which is found to withstand severe bending tests without cracking. One metal-finishing plant in Brooklyn is successfully spraying this finish on steel sheets of large area and baking them at 225 deg. F., for white paneling in lunch rooms.

### Light Shades Baked at Low Temperatures

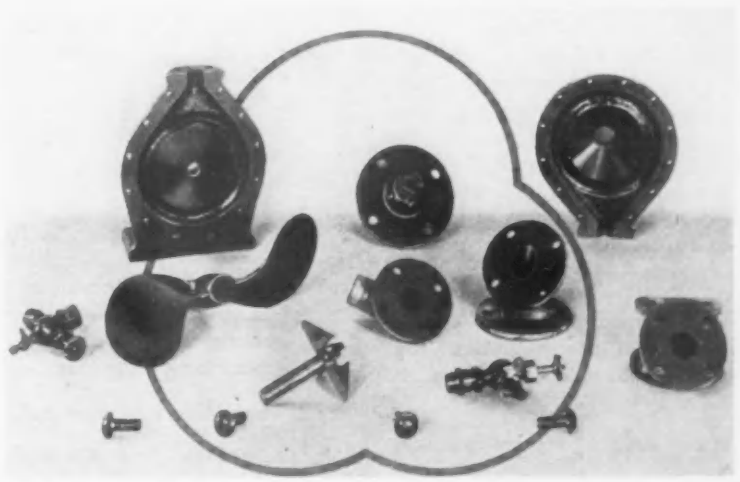
In finishing metal products with enamels, application is by hand, spray, or by dipping, depending largely upon the product and the production methods in the shop where it is made. Where coatings are applied to articles made under conditions of straight-line production, it is usual to have a finish baked at 250 to 300 deg. F. for 30 to 45 min., in the case of primary colors, and at not to exceed 170 to 225 deg. for 2 hr., in the case of a white enamel, or a light shade. Higher baking temperatures on the light pigments are not desirable, as they usually cause coloration, and continued too long, produce a mottled brown on the surface.

Highly satisfactory, air-drying synthetic resin enamels have been developed recently and are beginning to be used for certain products, such as the washing machine previously mentioned. The baked finish, however, is generally considered most desirable, as it permits accurate determination of the time required to finish each product, so that movement through a plant may be continuous.

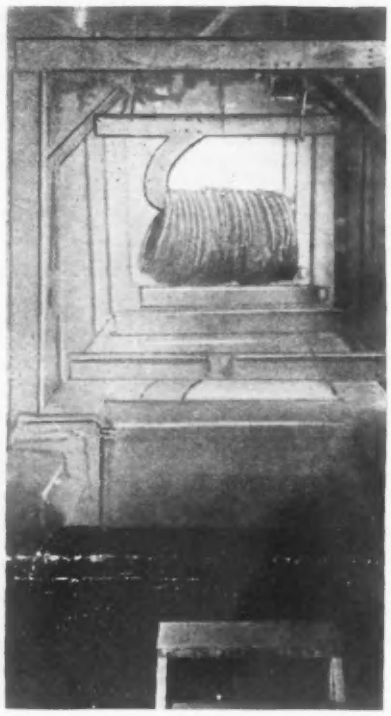
These newer air-drying coatings, however, are claimed to be less subject to oxidation than formerly, as they absorb but little oxygen in drying and hardening, and lose weight less rapidly by evaporation than is the case with the usual paint or varnish coating. This development is permitting wider use of the air-dried finish, which after application may be permitted to dry at room temperature, or may be hardened in a few minutes in an oven with the temperature at 180 to 200 deg. F.

In preparing to apply either an air-drying or baking, synthetic resin

(*Concluded on page* 1534)



THESE parts of an impeller used in the manufacture of toothpaste are finished with a synthetic resin, in this case Bakelite coating. As the paste is slightly acid, metal contamination was a problem, solved by the synthetic resin.



COILS of wire rod are carried through the pickling process on special handling hooks.

# MODERNIZED PICKLING ROOM PROVES GOOD INVESTMENT

THAT it pays to bring the pickling department, which is very commonly neglected, to the status of other departments as regards modern equipment, layout and process control is the experience of the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Following the principles of modernization, this company, founded in 1845, has kept pace with progress throughout the years, making changes as improved facilities and methods have been developed. And these changes have frequently involved entire departments and considerable engineering, as in the case of the pickling room here described.

Installed last year, the new pickling facilities are such that one operator, under the occasional supervision of the foreman of an adjacent department, is able to descale daily some 80 tons of coiled wire rod—the quantity required under the normal schedule of operations. Analysis of operating costs several months after the new facilities had been in use indicate that the new equipment will pay for itself in two years.

### Six-Section Basolit Tank for Hot Acids

New equipment installed includes a six-section brick-lined concrete tank, acid and leak-proof; automatic temperature controls; a tank for conveniently adding sulphuric acid to the baths; and narrow gage track, special cars and a gantry crane that permit economical straight-line progress of the work from the stockroom to the first bolt and nut manufacturing operation. With these was worked out a definite schedule for testing the acidity and the iron content of the pickling baths, as well as other details making for high efficiency of the cleaning process.

The largest items of new equipment are the acid tank and the gantry crane. The tank is 40 ft. long and is divided into six sections, each of which is 5 x 5 ft. x 6½ ft. deep, inside dimensions. Five sections contain acid solution for pickling five coils of wire rod simultaneously, while the sixth is equipped for water rinsing. In the latter, water jets direct a heavy spray from all sides toward the center, sufficent rinsing being thus obtained without the usual immersion in water. A seventh section, located at the end of the main tank but of the same inside dimensions as the other sections, contains lime for coating the pickled and rinsed wire rods.

### Leaky Tank Would Hamper Schedules

It was realized from the beginning that a pickling tank of sturdy, leak-proof construction was required if the advantages derived from a carefully worked out pickling schedule were to be obtained. A leaky tank would make impossible strict control of acid and temperature conditions; and the leaks, in addition to being a source of annoyance, would give rise to high repair costs and loss of production. Tanks of Basolit construction were chosen as meeting these demands.

The outer shell of these six pickling tank sections is of reinforced concrete, and the inner walls and bottoms thereof were treated with a special asphalt cement, which retains its flexibility and is acid-proof under all temperature conditions. The tanks then were lined with a double layer of acid-resisting brick. Separator lugs, ⅜ in. high, molded on the face of these bricks, provide a uniform space at all joints, which space is filled with Basolit, a cement that sets and hardens instantly and is acid proof for any industrial purpose. Basolit is immune to the action of most acids, including sulphuric, hydrochloric and 30 per cent nitric acid solution, this immunity extending to hot as well as cold solutions. It is made by the Nukem Products Corpn., Buffalo, N. Y., which has patents pending on the Basolit tank construction, and cooperated in this installation.

A brick coping at the top of the tank walls, formed by carrying the brick-lining over the top, provides protection from any acid that might drip from the wire rod as it is removed

from the pickling bath. To improve the appearance, as well as for protection, the outside concrete walls were also coated with the special asphalt cement. The quick-setting characteristics of the Basolit permitted putting the tanks in service 24 hours after they had been completed. Expansion and contraction during the heating and cooling of the tank is well provided for, insuring against cracks and subsequent leaks.

The question of drains for dumping the spent acid received special attention. In the tank here described, each of the six sections is provided with a bottom drain, constructed to meet expansion and contraction and provide a permanent and leak-proof outlet. The drain pipe is provided with a tapered seat of hard lead and a tapered lead plug fits into this seat. The plug is equipped with a ring to which a rod can be hooked so that the plug may be reached and the tank drained. As the drains are located in one corner of each section, it is easy for the operator to grapple for the ring of the plug, particularly since the lower end of the rod is provided with a horizontal extension of a length exactly the distance of the center of the plug to the wall.

### Department Laid Out for Straight-Line Flow of Work

In view of their contribution to the high efficiency of this pickling department, the general layout and the method of handling the material will be outlined before describing the temperature control and other accessories that more properly belong with the description of the tanks and their operation.

The wire rod coils pass in a straight line — with no back-tracking — from the stockroom, through the pickling, rinse and lime baths and on into the wire rod drawing and sizing departments, where the first step in the actual manufacture of bolts and nuts takes place. The cleaning room is narrow in comparison with its length, forming a passageway for material from the stockroom to the first manufacturing department. It will be seen that the room is open on both ends and is thus part of the shop proper—not closed off by itself, as is frequently the case. The pickling tank extends almost the entire length of the room, the first acid section being next the stockroom and the lime tank being adjacent to the draw blocks, where the drawing and sizing operations are performed.

From the stockroom the wire rods are brought to the tank by cars on a narrow gage track that has a slight grade to permit the loaded cars to descend by gravity. These cars are designed to hold coils of wire rod in a horizontal position and are equipped with convenient hand brakes; they are light enough to be pushed back empty to the stockroom by the cleaning room operator.

**BY engineering a new pickling room layout and providing new equipment accordingly, the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has put its wire rod cleaning on a more efficient and a lower cost basis. Of the improvements, the tanks and their automatic temperature controls have contributed a large share.**

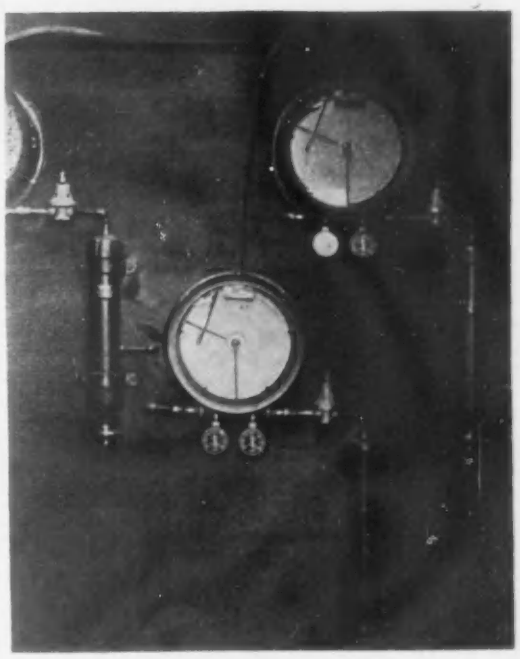
The coils of wire rod are placed in the various sections of the pickling tank and later carried to the draw blocks by means of a gantry crane that straddles the tanks and operates on a track extending the entire length of the cleaning room. They are suspended in the acid sections, the spray section and the lime bath on hair-pin hooks or yokes equipped with an acid-resisting aluminum-bronze arm. This arm is attached to a piece of I-beam that is equal in length to the width of the tank, and at the center of the I-beam is a ring which receives the hoisting hook of the crane.

These yokes are large enough to hold several coils of stock, which in practice are lowered into whichever tank is available. During the pickling, rinse and lime operations the I-beam that carries the yoke rests on the side walls of the tank, suspending the coils in the solution. While the coils are in the acid bath, other lots are being transferred to the rinsing spray, the lime bath or the draw blocks. Progress of the work is therefore continuously forward from the stockroom to the manufacturing shops, and with little or no waiting for one step of the process to be completed before moving the work forward.

### Pickling Bath Temperature Controlled Automatically

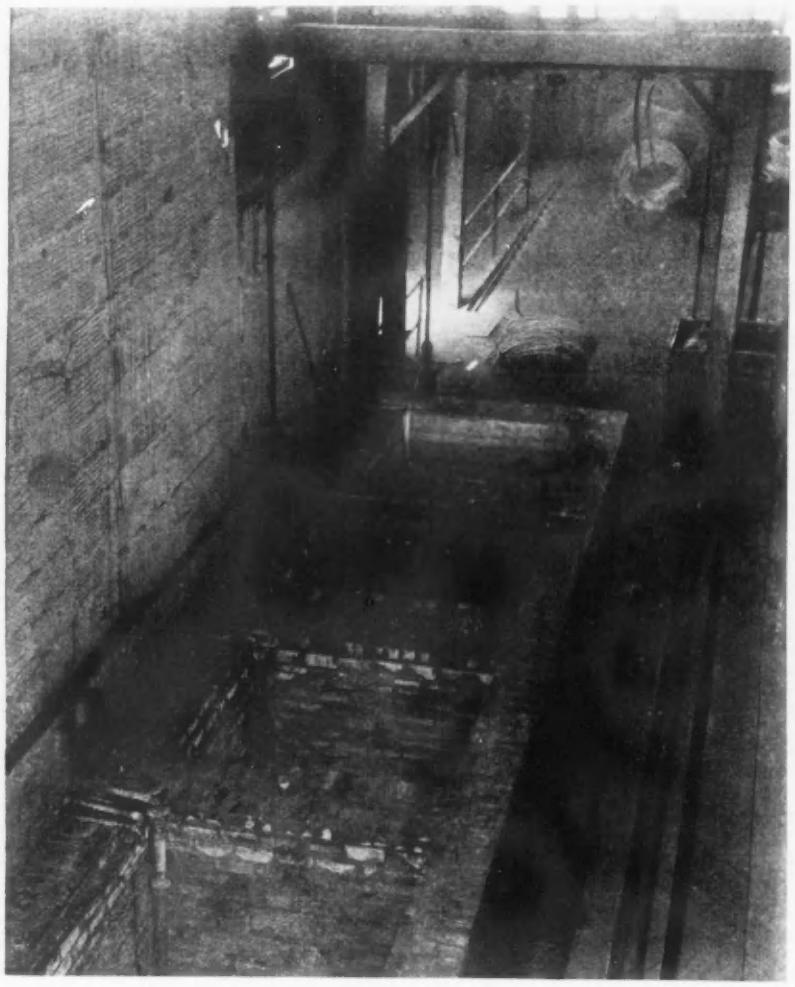
Automatic temperature control of the pickling baths is another departure that reflects the progressive attitude of the Russell, Burdsall & Ward company as regards its manufacturing facilities. It is scientific, and assures economical as well as efficient operation. Kept at the proper temperature, the bath loosens the scale thoroughly with a minimum of acid consumption. Lower temperatures retard the chemical reactions and slow up the process, while excessively high temperatures result in waste of acid and the production of fumes that make working conditions disagreeable. Automatic control of temperature assures freedom from these irregularities, as well as economy in this part of the process.

Each acid tank section is heated by



**AUTOMATIC controllers maintain the pickling baths at the proper temperature. They are adjusted at regular intervals by the general foreman who sets the temperature for maximum efficiency as determined by tests of the pickling solution made twice a day.**

a steam jet mounted on an acid-resisting pipe that extends vertically into each tank at one corner. These branch pipes are supplied from a main steam line at the rear of the tank; they are equipped with air-operated valves that are controlled by automatic temperature indicating and recording instruments. This control equipment provides means for setting the temperature at which it will operate, normally about 180 deg. F.; when the temperature falls below this, steam is injected automatically into



The pickling room forms a passageway from stockroom to manufacturing departments.

that tank section, and when brought up to the proper heat, the steam supply shuts off automatically.

In addition to its function of keeping the acid solutions at proper heat, the action of the steam serves to agitate and thoroughly mix the solution, which assures even removal of scale.

### Control Instruments Located In Locked Closet

Where to locate these temperature control instruments was a problem to the management. Placed in the cleaning room, they might tempt the operator to run up the heat as much as possible in order to hasten the pickling process and thus maintain a high production record. This would result in excessive fumes, waste of acid and perhaps uneven quality of pickling, according to the degree of speeding-up practiced by the operator.

Accordingly, it was decided to locate the automatic control instruments in an adjoining room in a locked closet, the key of which was to be kept by a foreman whose duties included testing the pickling solutions in each tank twice a day. The interest of this foreman, it should be stated, is in increasing the overall efficiency of the department as a whole, rather than increasing tank output without regard to accompanying waste.

The two daily tests made by this foreman are the degree of acidity and the iron sulphate content of the solutions, both of which affect the degree of temperature to be maintained. These chemical tests are simplified by the use of "pickle pills" in titrating samples of the liquor.

In adding concentrated acid to maintain the strength of the solutions, the usual practice is followed. As the iron sulphate content, a by-product of the pickling, increases, the acidity is raised in order to keep the pickling time within reasonable limits. Before the solution becomes so heavy that dumping is required, the acid additions are stopped and the temperature is run up to 200 deg., a procedure intended to use up as much of the acid as possible before dumping, and thus effect an appreciable economy.

### Tank Designed to Simplify Proportioning of Pickling Solution

Approximately 2 gal. of commercial 66-deg. Baume sulphuric acid is used in pickling one ton of the coiled wire rods, which are for the most part of low-carbon steel and range in size from No. 5 to ⅞ in. This acid is stored in a horizontal cylindrical tank that holds about three tank carloads. From this tank the acid is forced by air pressure to a smaller supply tank mounted outside of the pickling room; from the latter it flows through piping and valves to the various pickling baths as desired.

A noteworthy feature of the supply tank is that it is proportioned so that each 1 in. of tank depth is equal to 1 per cent of the capacity of each pickling tank section. Thus, as each pickling tank section holds approximately 1000 gal., the supply tank was designed to have a horizontal sectional area of 2310 sq. in., or a capacity of 10 gal. per in. of depth. If it is desired to add 1 per cent of acid, for instance, it is only necessary to run in acid until the level of supply tank has dropped 1 in. as indicated by a gage located conveniently in the pickling room. This arrangement greatly simplifies adding any desired percentage of concentrated acid to the pickling solutions—old or new.

The general description of this pickling room layout necessarily includes the important item of proper ventilation, the lack of which is detrimental to the comfort and health of the operator and adjacent fellow workmen.

Louvers in the walls near the ceiling serve to draw off the few fumes that are produced despite the close temperature control and the use of an inhibiting agent. A large air duct extends the length of the department, supplying heated air in the winter and unheated air at other seasons. This current of air, directed above the tanks, serves to carry the fumes upward. So effective are the various facilities for assuring "fumeless" working conditions that this pickling room is distinctive for the absence of unpleasant working conditions.

# A Plea for Better Methods of Selecting Tool Steels

THE tensile, heat and acid-resisting, impact and fatigue properties of S. A. E. and other steels are available to designers of machinery, automobiles and other engineering products. A plea for similar data on the properties of tool steels was made before the National Metal Congress, Boston, in a paper (abstracted below) by H. G. Keshian, metallurgist, Chase Companies, Inc., Waterbury, Conn.

WHAT does tool steel mean to the average consumer? In the selection of tool steel does he evaluate the different kinds of steel in terms of their specific properties or by their mere names? While there are considerable amounts of data at present relative to the different properties of steel and a respectable number of engineers and technical men constantly endeavoring to apply this knowledge to a multitude of demands of modern life, obviously, it rarely occurs that the choice of tool steel is made on a definite and quantitative knowledge of the properties of tool steels.

Terms, such as "keen cutting edge," "toughness," "high wearing property," "freedom from excessive warpage," "resistance to shock or impact in high degree," etc., at best are mere conventional phrases to describe certain physical properties and are devoid of any definite quantitative data. They are not only insufficient to guide the tool designer in his efforts to select proper steel, but also frequently confusing.

### Present Methods of Selection

The present status of selecting tool steel and a necessity for improvement can better be realized by considering the existing methods in general use. Generally speaking, steels for various tools are selected, at present, according to

(1) Tradition.
(2) Personal experience.
(3) Recommendation of steel makers.
(4) Service test.

So it is obvious that neither of the first two methods mentioned are satisfactory as a means of truly evaluating the fitness of any type of steel for a given purpose. We all know that these divergences of opinion on the relative merits of tool steels have always existed, and still do exist. We also know that many reasons and explanations have been offered, but the primary reason appears to be the fact that very rarely are the absolute physical properties of the steel measured in definite, quantitative and comparable manner as a basis for the opinions held.

### Recommendations of Steel Makers

The third method of selecting tool steel is on the recommendation of the steel maker. He makes the steel and it is presumed he ought to know what characteristic properties his material possesses; therefore, he is the one that is in a position to tell for what purpose his products are best suited. Among the many sources containing steel makers' recommendations regarding the choice of tool steels, the catalogs published by various steel companies are most frequently used. It is quite in order, therefore, to inquire to what extent these recommendations properly guide the tool engineer or the mechanic in selecting the right steel for a given job.

Perhaps a good way to pursue this inquiry is to quote some of the recommendations from the catalogs of several outstanding foreign and domestic steel companies. Let us assume that we have the problem of selecting steel for cold heading dies. If we turn to these catalogs for information on header die steel we find the following:

Steel company A says this: "Our various grades of die steel are designed for severe usage and record breaking service, from the initial stage of manufacture and throughout each succeeding step, every department through which the steel passes, and every workman who helps to complete it, understands full well that *quality* must characterize the steel—For heading dies we recommend our 'X' steel to the user who demands the highest possible service and efficiency. Extreme care is used in the manufacture of these steels, the aim being to have them thoroughly homogeneous and relieved from internal strains. Heading Die Steel is supplied in rounds, squares, flats and special sections."

Steel company B says this: "This particular temper deserves special mention because it has held for years, and continues to hold, an enviable place in the esteem of users of cold work steel. It is securely entrenched in its position for certain types of header and forming dies and we recommend it with confidence as a dependable high-grade steel for general cold forming and upsetting purposes."

Steel company C has the following to recommend: "X steel, being a tough steel of medium alloy content, hardens to a great depth and will stand high pressure. It is chiefly used for tools . . . which are specially required to resist pressure . . . such as rivet dies and cold heading dies, etc."

Steel company D says: "This is a selected steel for a specific purpose and is recommended for all tools used in connection with pneumatic hammers and for everything that is subjected to a succession of rapid blows."

Steel company E says: ". . . X steel is a carbon-vanadium tool steel, possessing all the characteristics of a straight carbon tool steel . . . greater resistance to fatigue, and superior cutting qualities. X steel is used in making taps and reamers . . . cold heading dies and rivet sets."

Again, let us assume that we want to select a steel for drawing dies; by following the similar procedure we find that

Steel company A says this: "X steel is a water hardening steel of most enduring qualities for tools that must retain their size with a minimum amount of wear, such as drawing and master dies. 'X' steel is one of the longest wearing steels made."

Company B says: "Steel X is a high-grade alloy steel recommended for hard dies for general cold drawing work. It becomes excessively hard with a sort of self-lubricating surface" . . . etc.

Steel company C says: "We recommend X steel for blanking and trimming dies subject to very high pressure and severe duty. It will also give excellent service for wire-drawing plates for steel wire, copper and brass wire, also for complicated and expensive dies where

value is laid upon a keen cutting edge resisting abrasion."

Steel company D says: "X, a super die steel that knows no master, designed specially to meet the exacting requirements of accuracy and production demanded by twentieth century efficiency engineers . . . it possesses the maximum resistance to abrasion, sinking and wear of any die steel known."

Steel company E says: "X steel is the very highest grade of tempering steel, recommended for drawing dies for brass and copper and for blanking dies for hard materials."

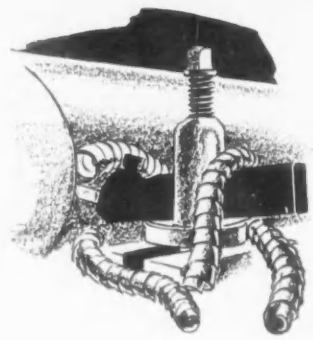
The quotations illustrate the third method of selecting tool steels. While they have been quoted here not with a view to criticize the substance of these recommendations, although they are of much help to the person who is in pursuit of the best and carry weight of confidence and certainty based on the integrity and experience of the maker, they still lack that quantitative information which the engineer is looking for. These recommendations give no measurable data on the properties which each manufacturer claims his product possesses. If the required chief properties of a header die are resistance to impact and wear, it is reasonable to expect that these properties be given in numerical values in terms of some accepted standard method of testing these properties.

Again, if the principal requirements of a cold drawing die are strength and ability to wear, it is quite necessary that these properties of a steel recommended for that purpose be given in numerical values in terms of some accepted method of testing wear and strength so as to enable the user to select the proper steel.

### Selection by Service Tests

The fourth method of selecting tool steel is what is called the service test. The basis of this test has a similar meaning in its final analysis as the popular saying that "The proof of the pudding is in the eating"; but one must not forget that there has always been considerable difference in the tastes of the persons eating the pudding.

The service test is perhaps the only test approximating the true test. Its value, therefore, should not be underestimated; yet it is a fact that often the results of the service test greatly differ, in similar applications under presumably similar conditions. And since quite often the same kind of steel made into the same class of tools and heat treated similarly but used by different operators shows contradictory results, it becomes quite evident that even the service test is not to be too confidently considered as a satisfactory method of telling the true and intrinsic values of various kinds of steel, and so long as the conditions surrounding such tests often vary from plant to plant, the service test will always be a source of uncertainty and contradiction to the consumer and unfairness to the steel maker. Moreover, the service test often is expensive and lacks the simplicity of a standard test.



If what has been said about the principal methods of selecting tool steel in use at present is true, namely, none of them gives the necessary information regarding the absolute and inherent properties of a given type of tool steel, then we want to know if it is possible to catalog, so to speak, the various properties of tool steels, such as wearing, shock resisting, cutting, shrinking, fatigue and other characteristics, in definite and comparable figures in the same manner that tensile, yield, elongation, etc., properties of structural steels are cataloged for the more intelligent use of the structural, automobile and aircraft engineers.

For instance, we have the problem of measuring wearing properties of tool steel. There we have straight wear like in a cold drawing die; impact wear like in a header die; rolling wear like in a ball or roller bearing. How can these different forms of wear be reliably tested or measured? These and other properties which we want to measure render the problem of devising testing methods for tool steel quite difficult. Yet in face of these difficult problems we have the fact that man has succeeded in solving even more difficult problems, and the speed and thoroughness with which he has solved them have depended on the eagerness and the determination with which he has engaged in his task.

### The Author's Experiment

The author, in an effort to ascertain the relative values of a few types of tool steels for cold drawing dies, made the following experiment:

Eight different brands of steel recommended for drawing dies were picked up and from each three drawing dies were made. Then each set of dies was heat treated according to the instructions of the manufacturers. The dies were tried on drawing admiralty tubes under practically similar conditions. A careful record was kept of the number of feet of tubing drawn per die and the amount of wear of the diameter of each die. The commercial ratings of the different brands of steel and the wearing properties, as measured in terms of number of feet of tubing drawn per 0.001 in. wear in the diameter of the die, are given in the table.

In the table the steel costing the most is given a commercial rating of 100 per cent and the steel showing the maximum number of feet of tubing per 0.001 in. wear in the diameter of the die is given a maximum wearing property of 100 per cent.

*Table of Wearing Properties of Eight Steels*

| Steel No. | Commercial Rating, Per Cent | Wearing Property, Per Cent |
|---|---|---|
| 1 | 100 | 34 |
| 2 | 83 | 26 |
| 3 | 72 | 21 |
| 4 | 72 | 31 |
| 5 | 72 | 100 |
| 6 | 63 | 82 |
| 7 | 56 | 24 |
| 8 | 45 | 31 |

From the table it will be noted that there is no relation between the commercial rating of these steels and their wearing properties, namely, that the steel that has the highest commercial rating is the third in wearing property and the steel that is fifth in commercial rating is the highest in wearing property.

▲ ▲ ▲

## Some Companies Have Succeeded in Depression

The Bureau of Foreign and Domestic Commerce has completed a survey of business concerns that have made material progress during the depression in maintaining or increasing sales volume or profits. Three hundred and fifty-eight examples, comprising 202 manufacturing industries, 43 retail distributers and 10 wholesalers, were gathered from various types of business throughout the country.

In summarizing the reasons for types of policies that have been successful in maintaining a good record of sales or profits for these companies, the bureau gives increased sales efforts and advertising first place. Market research, reduced prices, cooperation with dealers, improvement of service and management of salesmen all occupy a prominent position in the marketing programs of these companies.

Among the various types of companies in the metal-working industries, whose experiences are published are those making the following products: automatic stokers, piston rings, aluminum and brass products, electric welded pipe and other welded equipment and motor cars.

Copies of the report may be obtained from the Bureau of Foreign and Domestic Commerce, Washington.

▲ ▲ ▲

Reports from 1776 plants engaged primarily in making electrical machinery and apparatus showed sales aggregating $2,230,361,000 in 1929, of which 38.6 per cent or $859,957,000 was made to industrial consumers, according to the Distribution of Census. This class of consumers is made up of manufacturers, power companies, railroads, etc.

# Gas-Welded and Brazed Joints for High-Nickel Alloys

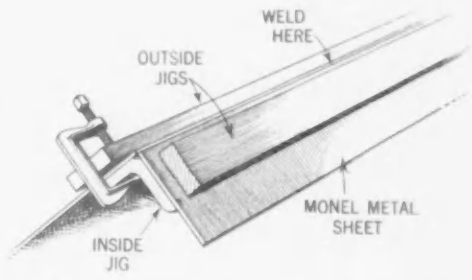
OXY-ACETYLENE welding of Monel metal, pure nickel, and Inco chrome nickel in chemical fields requires proper jigging and clamping, particularly with the lighter gages. Also where fluxes and welding rod are used they should be of proper composition. These were the essential facts presented before the thirty-second annual convention of the International Acetylene Association by F. G. Flocke, J. G. Schoener and R. J. McKay, International Nickel Co., New York. Some methods of making typical seams by welding, silver soldering and brazing were also described.

A peculiarity, manifested in high-nickel alloys and present though perhaps not nearly so marked in other metals, is a hot-short range—a range of low-tensile strength and brittleness between the temperatures of 1450 to 1650 deg. F. Both above and below this hot-short range these alloys regain their normal strength and ductility. For this reason expansion and contraction must be taken into account, so that no undue stresses are set up or existent while the weld is cooling and the weld metal and immediately adjacent metal are passing through the hot-short range. This is accomplished in part by allowing the weld metal to draw and contract in a natural manner instead of holding it so rigidly as to prevent contraction.

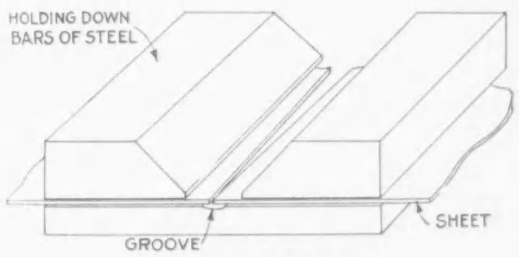
### Proper Jigging Is Essential

It is in part because of the condition just mentioned, as well as the fact that it facilitates welding to a marked degree, that proper jigging is found essential not only in non-ferrous alloys of high melting points, but for the ferrous group also. It is the partial or complete overlooking of this question of jigging that is at the root of a number of welding difficulties. This holds particularly for sheet work rather than for heavy plate, because the tendency of the former to warp is far more pronounced. There may be taken as an example a 2 or 3-ft. longitudinal seam on the side of a cylindrical tank of medium-gage metal 2 ft. in diameter. In speeding up the work the welder is likely to tack at one end then spread and clamp the other. As he progresses in the welding, there is bound to be some distortion, one edge of the seam lifting up, or in approaching the end the edges may have drawn together too fast and so overlap.

It is better practice to take enough time to prepare the work properly. The appropriate jig is simple, consisting of a piece of 3/16-in. steel plate 8 to 10 in. wide and as long as the seam. It has a shallow lengthwise central groove, two angles, one for each top side of the seam, and four C-clamps.




JIG for corner weld. The sharp corner of the inside jig angle is removed and the sheets are placed so that their inside corners are just touching.

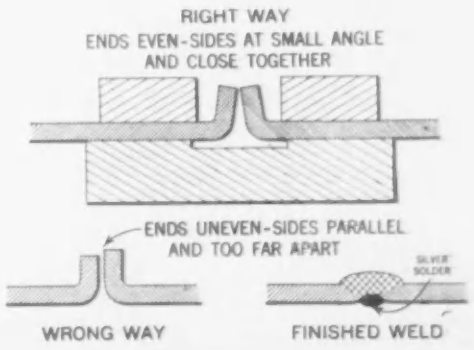



TYPICAL welding jig for butt seams. When backing plate and holddown bars are clamped they act as a chill, absorbing heat that might otherwise warp the sheets.

### Jig Absorbs Heat, Prevents Buckling

C-clamps are used for holding the jig together when in use to assure metal to metal contacts between jig and sheet. By doing this, the jig acts as a chill, also absorbing heat that would otherwise work into the sheet and warp it. Occasionally copper bars have been used to provide maximum heat absorption and a minimum of buckling. The purpose of the groove is to permit more rapid welding, as well as to allow the bottom edges to be thoroughly fused. In a case like the above the flux is generally applied by painting thin paste on both sides of the seam, top and bottom.

The oxy-acetylene flame used should be very slightly reducing, that is, a little excess acetylene, with only a slight feather, no longer than an ⅛ in. showing beyond the tip of the luminous cone. In an oxidizing flame copper oxide forms, in the case of Monel metal, and dissolves in the




EDGE welds are facilitated by use of a jig of this type. Angles are sometimes substituted for the rectangular top bars shown here.

molten metal rendering the alloy brittle and less resistant to corrosion. In the case of nickel and chrome nickel there is a definitely oxidized metal if a reducing flame is not used. It is well, during actual welding, always to keep the end of the welding rod well within the flame, so as to prevent oxidation that would result if the hot rods were brought outside of the protecting flame envelopes into the open air. Besides being reducing, the flame should be soft, rather than harsh, as is the case when too small a tip is used.

### Flux Applied as Powder or Paste

A flux is always used for Monel metal and Inco chrome nickel and occasionally with pure nickel. In using flux, there is a twofold purpose in mind: (1) to prevent the metal from oxidation and to dissolve oxide, and (2) to improve the fluidity of the molten metal. Flux may be used either as a dry powder into which the heated end of the rod is dipped, or as a thin paste. The paste is made by mixing the dry powder with alcohol or dissolving it slowly in boiling water. To secure proper solution the water must be boiling and not merely hot.

When used dry, the flux will flow around each drop of metal and, penetrating to the underside of the weld, will then protect the weld metal from oxidation and actually keep the metal bright. When used in paste form the flux is painted on the seam with a small brush or acid swab and occasionally on the welding rod.

Ordinary borax, widely used as a flux, improves fluidity of the molten metal, but when present in large quantities the extra fluidity is accompanied by lack of ductility in the finished weld. It does not dissolve the metallic oxide sufficiently to produce the clean appearance sometimes necessary and it is rather difficult to remove. The Inco gas welding and brazing flux can be applied in either dry or paste form though with silver solder, paste is preferred. This flux does not corrode the high-nickel alloys and need not be removed on this account. However, it is usual procedure to remove it as a matter of cleanliness and this is easily done by dissolving in warm water.

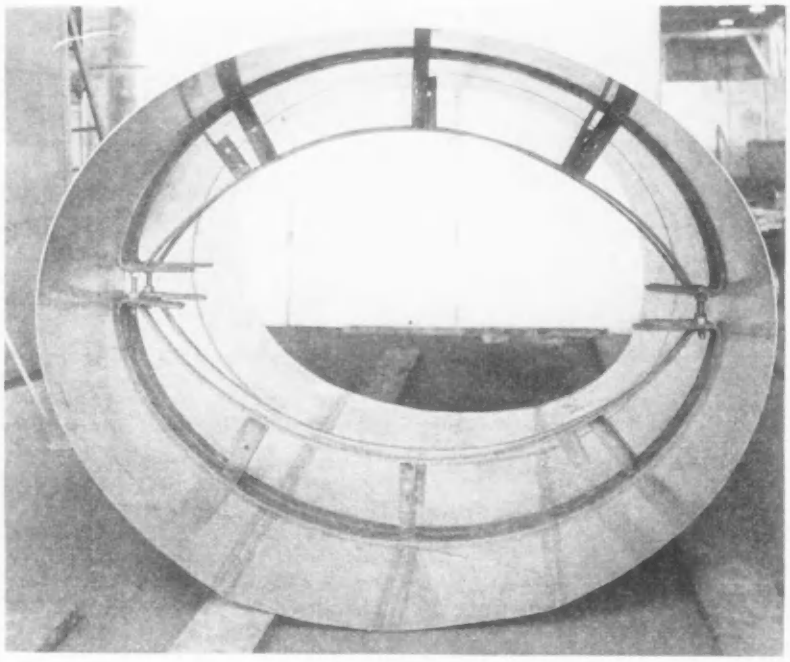
### Preventing Gas Absorption

For the best results on high-nickel alloys there should be little puddling; the molten pool should be kept quiet with the tip of the luminous flame just touching its surface. Extra caution should be exercised in this respect with nickel alloys, because nickel absorbs gases quite readily while molten and precipitates them as gas pockets on solidifying.

The proper size of tip is best determined by the welder's judgment. If the welding progresses too slowly it is logical that he should increase his heat, either by a larger flame with the tip already in the torch or by putting in the next size larger tip; conversely, if the heat is too great, and as a result holes are burned in the metal and the weld metal is boiling instead of being quiet, obviously the heat should be reduced.

Welding rods are in general of the same composition as the alloy being welded. Wire should be bright annealed, soft and free from oxide. Rods to be used for welding should always be so specified.

Welding of thin gage metal is not difficult. This is accomplished by flanging the edges slightly less than 90 deg., the turned up edges being as short and as nearly the same height as possible. Before assembling, the bottom and top of the seam is painted with paste flux. No welding rod is needed, the edges merely being melted down with the acetylene flame and the crevice left on the underside is filled in with either soft solder, silver solder, yellow brazer, or white brazer, depending on the corrosion problem involved. A seam of this type would be used in making long seams on thin gage sheets and in the making of spheres by welding two half sections together.



Skeleton jig used in making girth seams in a truck tank. Note jacks for spreading the jig sections.

### Welding Nickel Alloy Tubing

Seamless tubing and pipe is available in all three high nickel alloys and in the fabrication of these there are several types of joints usually used. With pipe or heavy walled tubing the ends are beveled to a total of 90 deg. then tacked on opposite sides with an even spacing of about 1/16 in. to 3/32 in. at the base of the vee depending on the diameter of wall thickness. If a straight butt joint is used no jigging is necessary. For the higher walled tubing the joint is made with silver solder either as a sleeve joint or a bell and spigot joint. The most important requisite is that the fit be good.

The recently developed white brazing rod fills the gap between silver soldering and welding rod, flowing at about 1900 deg. F. This relatively high melting point is in its favor, since when brazing with it, the braze will have solidified and contracted slightly before reaching the hot short range of the sheet metal, at which temperature, any considerable amount of strain might cause cracking.

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## Abrasive Resisting Wire Screening

A new development in the manufacture of alloyed steel screening, where unusual abrasion is to be resisted, is known as Jersey "Abraso" EE spring steel, which is adapted for use on vibrating, rotary, shaking and gravity screens.

This abrasive resisting alloyed steel is made under a special process by John A. Roebling's Sons Co., Trenton, N. J., and is being supplied in practically all specifications from 6¼ in. openings down to 18 meshes per linear inch.

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Employees of the Crane Co. with a record of 10 or more years of service will receive bequests of the corporation's common stock from the estate of R. T. Crane, Jr., president of the company until his death recently. It is estimated that approximately 65,000 shares are involved and somewhere between 3500 and 5000 employees will be benefited.

# Mechanical Handling Profitable for Small Jobbing Foundries

## Engineer Says Such Plants Can Effect Savings Even Though System Is Better Adapted to Production Shops

THE smaller jobbing foundry can make profitable use of mechanical handling equipment if the question of flexibility is given proper consideration, according to H. L. Hoefman, engineer, Link-Belt Co., Chicago, in an address before the National Founders' Association in New York.

"It has been the general opinion among foundrymen that complete systems of handling equipment can be justified only in the large production shops turning out a fairly standardized product, and, it is true," he said, "that the greatest economies have been made in this type of foundry.

"Foundries, from the standpoint of mechanical handling, divide themselves into two distinct classes: those in which hot metal is available in a continuous stream, which are usually known as continuous foundries, and those in which, for various reasons, the metal is available only in "heats" at intervals, which are called intermittent foundries. The greatest economy can be and has been made in continuous foundries, because here it is possible to attain more nearly an ideal condition. Here a molder does nothing but mold, a pourer does nothing but pour, etc., with the result that each becomes expert in his particular task and tremendous production per man is obtainable.

"In foundries of this kind, every possible mechanical labor-aiding device will quickly justify its cost and maintenance by low-cost production and high tonnage records. For example, power-operated mold conveyors are usually employed, traveling in a rectangular path. The molders are arranged in line along one side of the conveyor and the molds, as completed, are placed on the moving trays. The conveyor is arranged for waist-high operation, eliminating carrying or bending on the part of the molder, and thus doing away with one of the most laborious tasks in ordinary foundry operations. By the use of mold conveyors properly suited to operating conditions, together with overhead storage of prepared sand, it is easily possible to double production per man from existing floor methods. Capacities of 50 to 100 molds an hour per molder are being obtained regularly.

"Just beyond the line of molders, and between the two runs of the mold conveyor, weight shifters are stationed, who place weights and jackets on the molds and remove them on the returning run of the conveyor after they have been poured. Beyond the weight shifters comes the pouring zone, and the entire system is arranged so as to place this as close to the cupola or melting unit as possible The ladles are supported from trolleys, traveling on an overhead track arranged in a loop, and the pourers obtain their metal from a tilting ladle set under the cupola spout.

"Pouring is usually done from a moving pouring platform about 2 ft. wide, 40 ft. long, arranged at about the same height as the mold conveyor and traveling at the same speed. This arrangement eliminates the necessity of the molder having to carry either the empty or filled ladle at any time; his only effort is to push it along the track and tilt it over the mold as he stands on the moving platform. With this arrangement one man can pour over 300 molds an hour and keep up this pace all day.

"After being poured, the molds round the corner and start on the return or cooling run. As each passes the weight shifters, weights and jackets are removed and transferred to other molds approaching the pouring zone. The rest of the cooling run is often covered by a cooling hood connected with an exhaust fan which carries off all steam, gas, etc., given off by the mold.

"At the far end of the conveyor is located the shakeout. Here shakeout man or men, depending on the size of the mold, remove it from the conveyor, and dump it into a vibrating or stationary grate, permitting the sand to pass through and retaining the castings. In some cases the mold is removed from the conveyor with an air hoist equipped with a vibrator, shaking the sand out of the flask onto the grating.

"In handling only snap molds, one shakeout man can usually take care of the output from 12 to 15 molders; but, on larger tight-flask work, two are usually required. In some cases, where only snap molds are handled, the mold conveyor is equipped with an automatic dumping arrangement, so that the shakeout man is eliminated entirely. Bottom boards and flasks are in some cases returned to the molder on the mold conveyor; in others, separate conveyors are necessary or desirable to do this work.

H. L. HOEFMAN

"The sand from the mold passes through the grating and is handled by a series of conveyors passing over a magnetic separator, where magnetic refuse is removed, and through a screen, where other foreign matter is taken out. Water is added to the sand and it passes through various types of mixers and is delivered finally, in workable condition, to prepared-sand hoppers located to discharge direct to molding machines.

"Absolutely uniform sand is obtained in this way, and such variables as moisture content, etc., are held within extremely close limits, assuring uniform results and lowering scrap losses to a minimum. The castings are often taken direct from the shakeout by a conveyor to the cleaning room, after being cooled en route. In other cases they are taken by trucks or cranes to the cleaning room.

"In the intermittent foundry, which includes practically all steel foundries and most non-ferrous foundries, the sand-handling system is arranged much the same as already described. But it is not possible to make use of the continuous power-operated mold conveyor, for storage must be provided for the molds until hot metal is available for pouring. The usual arrangement is to have the molders and machines arranged in line with the prepared sand hoppers overhead, and a series of lines of gravity rolls set at right angle to the line of molders. As the molds are completed, they are set on the gravity rolls and gradually moved away from the molder as additional molds are added to the line.

"When the metal is ready, they are poured directly on the gravity roll and, after allowing the required time for cooling, moved to the end of the conveyor line and shaken out. The shakeout hoppers are sometimes ar-

(*Concluded on page* 1534)

# Operating Problems in Open-Hearth Practice

MANY practical problems encountered in making open-hearth steel were discussed in Detroit on Nov. 24 and 25, at the fourteenth semi-annual gathering of the Open-Hearth Committee of the American Institute of Mining and Metallurgical Engineers. The first section of our report of the meeting appeared last week, and the third and concluding portion will be published in a future issue.

In this section are covered: Cracks in rolling slab ingots; speed of teeming a ladle of steel; shaking ingots to speed up elimination of gases; operating furnaces over the week-end; secondary regenerators; combustion control, with special reference to a Stevens furnace; inclusions in steel; soaking-pit practice; use of burnt lime; determining depth of reactions in an open-hearth bath.

### Cracks on Slab Surface

TROUBLE was reported to have resulted in a number of cases when rolling down a heavy slab ingot in the process of making large steel plates. The case of a 60,000-lb. ingot, measuring 40 x 90 in. in cross-section, was cited. This was reported to roll down to 20 x 180 in. in perfectly good shape, without giving evidence of any surface cracking. Proceeding further, however, about the time this slab reaches a thickness of 14 in., or one-third its original, it appears to develop surface cracks all over the flat area. Some of these may be transverse, but most of them are longitudinal, somewhat as shown in the sketch.

A similar condition was reported when working down a much smaller ingot, 21 x 48 in. in section, and at about the same stage of the operation. This was reported to appear on both killed and rimmed steel, being much worse in the former case. No one present had any adequate explanation as to the cause of this cracking; but the suggestion was made that the steel might not have been homogeneously heated, and that the effect of a colder core might have made itself manifest at the particular stage at which the trouble was noticed.

### Speed of Teeming a Heat

USE of two nozzles in heats from 90 to 135 tons was reported as a good means of getting quickly into the molds steel which is held in the ladle until it reaches the desired temperature. This steel is tapped at about 2950 deg. and has a temperature of about 2775 deg. after holding in the ladle about 10 min., the process of tapping having taken 10 or 12 min. preceding the "hold." This has to do with soft steel up to 0.15 per cent carbon, poured into 6000-lb. ingots, 20 x 20 in. in section.

Pouring such a heat through a single 1¾-in. nozzle was found to take about 70 min., whereas with two nozzles the heat is poured in 29 or 30 min. The fact that the two nozzles cut the time more than in half is accounted for by the rather sluggish action in the latter half of the period when pouring with one nozzle.

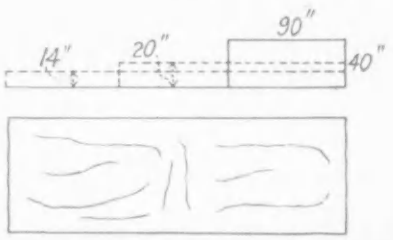
A similar practice was reported for hard steel, up to 1 per cent carbon, this being held for 25 or 30 min. in the ladle and poured in half an hour through two nozzles. The drop in temperature during pouring was reported as only 25 deg. or so.

### Shaking Up the Ingots

AN ingot shaker developed by Andrew G. Egler, Youngstown, was discussed by both Mr. Egler and another open-hearth man. Every type of steel, except killed steel, in the plants where this equipment has been installed is treated to the shaking. Already several hundred thousand tons, high-carbon and low-carbon, has been made in this way. It is the practice to tap the rimming heats a little hotter, and to leave no skull in the ladle. Pit scrap has been reduced by more than 40 per cent.

Specifically, a group of 500 heats, specified from 0.29 to 0.33 per cent carbon, was mentioned. These were cast into 21½ x 40-in. molds, making ingots of 11,800 lb., from which were produced two 5000-lb. slabs, with a yield of 85 to 86 per cent. In these heats the ferromanganese and 500 lb. of ferrosilicon were put into the furnace shortly before tapping. A carbometer test was run, taking about 6 min., and then the heat was tapped. Only three heats of the entire 500 failed to reach the specified carbon limits. A small amount of aluminum was used in the molds.

It was stated that rimming steel of the low-carbon variety will rim better and faster when shaken. No ingot, it was reported, was found to grow after being shaken. The shaking motion gets the gases out faster than otherwise, resulting in a smaller amount of segregation and in locating most of this segregation in the top of the ingot. Here the regular crop will remove almost all of the segregation, very little being left after cropping 10 per cent. In such conditions, in steel of 0.50 per cent manganese, the variation between top and bottom was not more than 5 points. A thick skin ingot with very little chipping cost was reported.



Illustrating surface cracking in rolling a slab ingot.

### Operating Furnaces Through the Week-End

RUNNING open-hearth furnaces straight through the week-end period was reported to save in brick and in fuel, because of maintaining a uniform temperature. This method was reported to save in hot metal also but this is a matter which may vary with the relation in cost of pig iron and scrap. Furnaces thus operated are kept always in their normal stride, and it is possible to make in them any specification of steel desired.

As a balance wheel, it was suggested that steel made for banking at this period would go a long way toward meeting surges of business during the week, or during the ensuing month, and thus avoid the expense of putting on additional furnaces.

### Adding to Air Preheat

SECONDARY regenerators to provide additional regenerative capacity were said to be an economical means to give an increase of preheat to the air. In the secondary unit the checkers are laid up with solid longitudinal walls. In one instance, with a 115-ton furnace, these walls were made of 4 x 9-in. brick, laid at right angles to the length of the chamber. This chamber measures 12 ft. 7 in. long, 11 ft. 6 in. wide and 4 ft. 6 in. deep to the spring line of the arch.

Each 100 deg. additional temperature given the preheated air was reported to increase hourly production of the furnace by 4 per cent, and to reduce by 4 per cent the amount of fuel used for each ton of product.

### Combustion Control on Open-Hearth Furnaces

A REPORT was made on the operation of a Stevens furnace, which was viewed by the members of the committee two years ago at Alton, Ill. This furnace is now in its third campaign, using an all-cold charge and burning oil as fuel.

After the first two campaigns, which were respectively 536 and 534 heats, the furnace was rebuilt each time from the floor up. Up to the date of the present meeting the third campaign had reached about 660

heats, and the furnace was still going strong. In the first campaign, which began May 11, 1929, a preliminary repair was made after 304 heats, as the roof was wearing thin along the skewback. The second campaign had preliminary repairs after 312 heats and the third, which began Dec. 21 last, after about 400 heats, when the front wall had to be largely replaced.

In the present campaign this furnace has averaged 66 heats a month, being 6629 tons a month, or a fraction more than 100 tons for each heat. The heats have averaged 10 hr. 55 min. tap to tap, being 9.21 tons an hour. There has been a yield of approximately 92 per cent and oil consumption has averaged 24.3 gal. to the ton of ingots. For all the 1730 heats in 30 months the fuel consumption has averaged 27.3 gal. Burnt lime is used to the extent of about 6 per cent of the metallic charge.

In this furnace the bulkheads consist of chrome brick and silica brick. The operation has been so uniform and so free from slopping that the superintendent has never looked into the slag pockets since the furnace was started. He said there might be 3 ft. of slag there. The regenerator brick, on general rebuilding, are replaced to the extent of about 15 per cent.

### Trend in Combustion Control

DISCUSSING the present trend of combustion control, it was emphasized that the final control of the fuel supply to the furnace must always be in the hands of the first helper. No automatic tool has been devised which can replace his judgment, but control equipment furnishes a very effective tool to assist him in his work.

It is not sufficient to maintain a constant draft on the stack, because of the many variations in working conditions which must be compensated for. The best location in a furnace for a draft gage has not yet been found. It is fairly satisfactory when placed in the roof, but is subject there to many variables.

To get the best out of machine control, furnaces should be sealed up, preferably with steel plates, to prevent infiltration of undesired and unmeasured air. It is found practically impossible to make an old furnace entirely tight. Automatic combustion control has been placed now upon approximately 50 open-hearth furnaces.

#### What Benefits Control Confers

Some of the advantages accruing from this practice include an increase of 5 to 10 per cent in the weekly production of the furnace, a decrease from 5 to as much as 25 per cent in the fuel consumed for each ton of product, an increase, reaching sometimes 2 per cent, in the yield and an over-all saving in cost of from 15c. to 30c. on each ton of ingots made.

Harry Dobrin, consulting combustion engineer, Pittsburgh, in discussing some of the variables entering into furnace practice, spoke of a case of automatic control on furnaces which previously had been reversed manually on a 15-min. time cycle. The automatic devices were set to operate on a temperature difference between the two ends. When first put to work the reversing cycle varied from as little as 4 min. at one end of the furnace to 12 min. at the other end, and sometimes as much as 16 min. When the leaks in the brickwork were plugged up, however, the difference between the two ends of the furnace was brought down to 3 min., with reversals about 9 and 12 min. respectively.

One collateral benefit of combustion control pointed out by Mr. Dobrin was the fact that the mere installation of equipment puts everybody on his toes and causes a great many other things to be done. Brickwork is tightened up, thus reducing infiltration. Frequently the furnace below the floor is plated in. Sometimes insulation is installed, along with this. There is a greater alertness in the operating men. All of these help the operating conditions, but they are only indirectly the result of the control apparatus itself.

### Inclusions in Steel

USING seven lantern slides to bring out his points, Dr. Charles H. Herty, Jr., reported upon inclusions found in railroad axle steel of 0.35 to 0.50 per cent carbon, all killed steel. His slides showed the effect of segregation at a number of different positions across the ingot, about uniformly spaced from top to bottom. It developed that the surface segregation is worst on the bottom cut and the top cut. The mid-section was much better in this respect in practically all the steel examined.

This investigation was carried on in conjunction with reports of seam inspection and chipping costs. It showed clearly the advantages of the use of a silico-spiegel alloy put into the furnace, as contrasted with the use of either ferrosilicon alone or ferrosilicon preceded by ferromanganese.

How these heats were worked was told in some detail by Charles F. Christopher of the United States Bureau of Mines. As soon as the scrap is melted and the lime is up, a start is made working on the slag, to get it into the proper condition. It was found necessary to have plenty of lime to give a fairly thick slag, and to have a very high temperature to eliminate inclusions.

Under this method, the large inclusions, high in MnO, are found to go out very rapidly, whereas the smaller ones, higher in $SiO_2$, are much more sluggish in their action. Addition of ferromanganese, by transforming some of the smaller inclusions into larger ones with the high MnO content, gives the best results in operation. This ferromanganese is put in, customarily, about 10 min. after the silico-spiegel addition.

Use of a large taphole, to get the heat out of the furnace as soon as possible after it is once started, was strongly recommended, because the investigation showed that the silicate inclusions work back into the steel out of the slag, if allowed time to do so.

### Proper Heating of Ingots for Rolling

OPENING up once more the age-old controversy between the steel maker and the blooming mill, one open-hearth operator spoke of the soft center sometimes found in steel in rolling, which causes uneven conditions and bad rolling practice. He expressed the belief that these soft centers are almost always produced in the soaking pit. He reported trying out the matter by following ingots through, and found that some of the pits could be made to make soft-centered ingots any time it was tried.

If the fuel is turned on in the soaking pit before the internal heat of the ingot is allowed to come out enough to equalize the temperature through the mass, this speaker expressed the opinion that that internal heat never does come out.

Use of burnt lime in place of limestone was discussed from two standpoints. One man reported that he finds a saving of about ¾ hr. in the time of making a heat through using the burnt product. Another man put the saving still higher, at from 1 to 1½ hr. In this latter case the extra cost of the burnt lime, compared with the limestone, in each ton of steel figures out at 17c. But the gain in productivity of the furnace offsets the extra material cost, four times over. Burnt lime, it was pointed out, will help a furnace use more scrap.

### Measuring Depth of Reactions

TO get a picture of the metal in the bath, from top to bottom, Mr. Christopher reported use of a steel rod covered with a layer or sheath of 12-gage lead sheet. This is immersed quickly in the bath, clear to the bottom. When withdrawn, it is covered by a sheath of the bath metal, which is not fused to it because of the lubricating effect of the lead. This sheath is easy to break off the rod, and the position on the rod of each successive inch of metal corresponds with a definite depth below the surface.

Attempts to use aluminum (melting point 1215 deg. F.) in place of lead (620 deg. F.) did not give such good results. Aluminum has the property of alloying with the steel and it introduces carbon.

This device has been used in efforts to learn how quickly reactions take place, as between top and bottom of the bath. From studies to date, it has been concluded that there is no measurable difference; the reactions seem to permeate the entire bath practically simultaneously.

*(To be concluded)*

# Stabilization Through Banking and Fiscal Policies

STABILIZATION through better control of the credit mechanism was urged by both Virgil Jordan, economist, *Business Week*, and Paul M. Mazur, member of the New York banking firm of Lehman Brothers, in addresses before the American Society of Mechanical Engineers in New York Dec. 2.

The speakers agreed that production had run ahead of consumption in the period preceding the depression. In Dr. Jordan's opinion maladjustments between consumption and production grow out of financial phenomena and cannot be prevented by anything that industrial management itself can do. Mr. Mazur also placed great emphasis on finance as a factor in stabilization, but made the additional recommendation that a national economic board of quasi-political character be set up to crystallize the economic policies of the nation.

The Reichswirtschaftsrat (National Economic Council) of Germany was briefly described in the discussion by Walter H. Rastall, chief of the Industrial Machinery Division, Bureau of Foreign and Domestic Commerce. The German board studies and reports on the economic consequences of each bill introduced in the Reichstag. It is purely an advisory body, having no veto power over the national legislature.

### Says Industrial Planning Is Passing Phase

Dr. Jordan does not take much stock in economic "planning" through a centralized agency. He concedes that "there may be some vague gesture toward it on a national scale by setting up a sort of economic council of 'stuffed shirts' supported by a staff of slide-rule operators; but probably most of this will pass out of the picture in the next boom period."

Both Dr. Jordan and Mr. Mazur believe that our national banking system needs modification, but the former despairs of any important early changes in our credit machinery and feels that the only hope of relief from economic unbalance is through taxation."

"The central defect of capitalism as we know it is the lack of any systematic or successful mechanism of income distribution—of dividing the product of industry between wages and profits," said Dr. Jordan. "The reason why this is serious is that it prevents a balance between saving and spending, consumption and production, upon which stability depends.

"Modern industry—and agriculture, too—based not on labor, but on utilization of an almost free fund of solar energy accumulated in coal, oil and water power, is so productive compared with human and animal energy dependent on food, that prices would disappear and profits, wages and capital values could not be maintained without some sort of systematic deliberate or unconscious sporadic sabotage by employers, financial interests and labor.

"But despite all this sabotage, productivity still increases at such a rate that prices, profits and return on capital can be maintained only by an equally rapid increase of consumption and consumer purchasing power. A larger and larger part of the product must go to those who spend their income, immediately or in advance (by consumer credit), and the rest must reinvest their surplus income more and more promptly (and continually in excess of their savings, through bank credit) in order to retain it. And, further, this reinvestment must be continuously or periodically confiscated or transformed into consumer purchasing power without return in order to keep that consumption up to production.

"Capitalism in every highly developed industrial nation is essentially a system under which we must continuously or periodically eat our cake in order to have it. . . .

### Capital Confiscation During Inflation

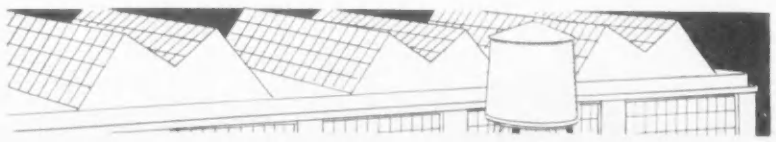
"We have periodically—largely under the influence of international forces—gold or credit inflows, a process of credit expansion which runs into inflation because of defective banking and investment systems. In the latest form, as seen in 1922-29, we had an excess of previous savings, swollen by large profits, supporting and supplemented by a pyramid of capitalized bank credit, transformed into consumer purchasing power principally through expanded construction of productive capacity, partly through instalment sales of goods and partly by leaks over into consumption via spending of speculative profits. The consequent rise in prices during the process, and before the productive capacity comes into use, constitutes a concealed confiscation of capital as the real value of dollar return on capital falls and the burden of fixed debt diminishes.

"It is becoming more difficult to determine definitely on which side—consumption or saving—the balance of loss occurs during inflation periods. On the one hand the modern investment machinery makes for accelerated speculative profit, which in part only can be actually reinvested and tends to overflow into luxury consumption, but is fully offset by speculative losses during subsequent deflation. Actual investment of savings or profits or credit capital shows up in increased productive capacity more promptly and thus tends to depress prices sooner or more continuously. This tends to increase consumer purchasing power more promptly and is reflected in the complaint of profitless prosperity. The expanded application of instalment selling also tends to turn more of the expanded bank credit into consumer channels.

"But on the other hand the investment of savings in construction, under modern methods, involves proportionately less and less labor, so that the conversion of capital into consumer purchasing power in the form of wages becomes less and less effective. Also, with the spread of participation in security speculation among all classes more and more purchasing power is withheld from consumption and subject to subsequent loss during deflation. On the whole, however, I think the balance of loss tends increasingly to fall on the side of savings or investment even during inflation.

### Confiscation of Savings During Depression

"At any rate, when the new productive capacity comes into use production again runs ahead of purchasing power and the decline of prices



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**STABILIZATION is a problem of finance rather than of industry, according to speakers who addressed the Mechanical Engineers. Both Virgil Jordan and Paul M. Mazur, prominent economists, recommended revision of our banking laws.**

**In addition, Dr. Jordan urged taxation for public works as a means of stimulating consumption and bringing it into equilibrium with production. Booms and depressions, he said, represent a violent means of confiscating savings and diverting them into consumption. The only question at issue is whether that confiscation can be made systematic, smooth and as painless as possible for everyone.**

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and depression sets in. The capital savings or credit that have gone into consumer purchasing power during the boom are then registered on the investors' books as losses—written off—by the depreciation of inventories, of security values, by defaults, moratoria and bank failures. There is an additional direct conversion of capital or savings into consumption as bank deposits are drawn upon for current needs. Foreign loans made during inflation periods, not offset by balancing imports of goods, are another phase of capital waste, since the proceeds are really paid out to domestic workers and losses borne by investors during depression. All that is, of course, a vast redistribution of purchasing power in which capital is dissipated or changes hands at reduced value, but in the meantime the difference has in large part passed into consumption during the boom. When the profit requirements or overhead are sufficiently reduced to be met out of the current level of purchasing power plus consumers' savings, business recovery begins and the cycle starts again.

"During the depression, labor, of course, loses by unemployment and lowered wages as much as or more than it gained in the transformation of capital during the boom; but this is offset in part by lowered prices and in part by diversion of capital funds into consumer purchasing power through private channels of charity and public channels of borrowing and taxation for unemployment relief. So here, too, it is probable that the balance of gain is on the side of the consumer and of loss on the side of savings, so far as the money accounting goes.

### Readjustment Necessary for Survival of Capitalism

"This process results in a continuous dissipation of capital and confiscation of savings and profits to the end that consumption in the long run is balanced with output. The cycle is essentially only a phase or aspect of the process of diffusion or distribution of purchasing power in capitalistic society. That process is continuous; booms and depressions are only an extreme or special manifestation of it. Year in and year out in all phases of the cycle consumer expenditures run ahead of the national income by a practically constant percentage which represents the chronic wastage or degradation of capital, that is, its reversion to consumer income. That is the only way competitive capitalism gets along at all."

Stabilization through trade associations—planning à la cartel—is an extreme symptom of capitalistic self-defense, in Dr. Jordan's opinion. "It has for its essential purpose to check the process of competitive confiscation which is the only automatic safety valve by which the survival of the system is assured; and it further tends to sterilize the element of technological improvement implicit in that process. Moreover, it inevitably implies an intensification of centralization, and so cannot be of any permanent importance because the undercurrent is in the opposite direction."

Dr. Jordan declared that capitalism in this country and communism in Soviet Russia are similar in that they are both confiscatory economic systems. Our capitalistic organization can survive only by a definite, though disguised, process of confiscation of unspendable surplus income or capital for purposes of consumption—partly periodic, partly continuous. Russia has confiscation of current consumption income for purposes of capital accumulation. "The only question that confronts both," according to Dr. Jordan, "is whether each kind of confiscation can or cannot, shall or shall not, be made systematic, smooth and as painless as possible for everyone.

### Favors Amendment of Reserve Act

As one step toward stabilization Dr. Jordan recommended revision of the Federal Reserve Act so as to insure greater security for bank depositors and to promote greater independence and more democratic access to reserve credit resources on the part of the individual member banks throughout the country.

Dr. Jordan would require complete inclusion of all commercial banks within the system, establishment of insurance reserves to guarantee bank deposits, and the widening of provisions and regulations regarding the classes of assets eligible for rediscount. He would make it illegal for member banks to engage in selling securities either directly or for trust accounts, and would completely separate such banks from security affiliates. The banks' "handling of corporation funds for loan in the call market without contingent liability should be controlled," he declared. "Finally, it will be necessary to establish a separate system of reserve credit resources for rediscounting intermediate and long-term loans to industry, trade and construction, similar to the intermediate credit and land banks for agriculture."

### Stabilization Through National Fiscal Policy

Changes in our credit mechanism can be made only in the face of bitter opposition from private banking interests, declared Dr. Jordan. There is more immediate promise of progress through national fiscal policy, he believes.

"Taxation is the most powerful weapon for redistribution of wealth and income ever devised, and by that token it is the most effective agency for stabilization. We can, if we wish, quite simply and easily prevent oversaving, over-investment, over-expansion and productive capacity, without waiting for this purchasing power to be confiscated by competition, inflation and deflation in the cycle of boom and depression, by taxing away with suitable income surtax rates and inheritance taxes all excess corporate savings and surplus individual income that cannot be spent by the recipients on consumer goods or replacement of obsolescent equipment, and spending this surplus through Governmental channels for the production of free social income by building public works, parks, museums, recreation centers, roads—all of which offer commodities or services for competitive sale, and in the building of which purchasing power for other goods is directly released in wages."

# Industrial Standards Stressed in Address Before Taylor Society

**STANDARDIZATION of production operations in wrought iron manufacture and the development of cost standards for varying profit objectives are outlined at management meeting.**

HOW management standards have been successfully adopted in the manufacture of puddled wrought-iron products was outlined by Myron H. Clark, vice-president, Reading Iron Co., Reading, Pa., in a paper which featured one session of the Taylor Society's annual fall meeting, held at the Hotel Pennsylvania, New York, Dec. 2-4. A standard cost system which provides for the automatic adjustment of profit objectives to changes in general business conditions was described by G. Charter Harrison, Chicago. Other sessions of the meeting were devoted to discussions of national planning, power and mechanization, and other economic and industrial subjects with special consideration of the causes of the present business depression.

Mr. Clark pointed out that standardization, as undertaken by his company, represented a problem that heretofore had not been approached from the same angle in wrought-iron production—an industry in which tradition has played a part and present conditions are the result of undirected growth or drift rather than of organized effort.

### Cost Studies Are First Step to Standardization

As a preliminary to standardization, cost studies were made. These revealed fluctuations due to many causes, some of them not definitely known, and indicated a general lack of control. A further survey of conditions showed that instructions, practice, specifications, etc., were not reduced to writing; in other words, there were insufficient safeguards to insure starting with uniform raw materials, subjecting them to uniform treatment and ending up with a uniform product.

A separate staff of engineers was given the task of investigating these problems so that standards could be developed without interfering with the routine work of the plant. Each standard was prepared and reduced to writing in collaboration with the head of the plant division to which it applied; the present standards, developed in this way, represent the best known practice to date, Mr. Clark declared.

Standardization of raw materials presented no problem, nor was it difficult to establish definite standards for blast furnace operation. The puddling process, requiring close temperature control, alternate oxidizing and reducing atmospheres and dependence to a large degree upon the personal equation, was the hardest to standardize. In the rolling process for producing skelp for pipe accurate standardization of temperature control was required also.

The planning department is responsible for scheduling production and determines for the sales department the standard times within which shipments can be made. The tonnage productions per hour, per man, per crew, etc., are obtained from the standards of practice and on these data the standard costs are based. This information, in conjunction with sales forecasts prepared by the sales department, enables the planning department to initiate adequate purchase requisitions and, at the same time, to keep the inventory under proper control.

In determining what the character of the standards would be, it was brought out that they could readily be classified into groups according to the division of the plant or process to which they pertained. Among these group classifications were mentioned buildings, auxiliary equipment, machines, tools and fixtures, maintenance, materials and supplies, finished product, methods and processes, and material handling. Standard rates of production provide an estimate of equipment necessary for a given volume of production or the expected production from given equipment.

As far as possible, standard crews are being developed for various operating volumes. Other standards pertain to job analysis, personnel or labor policy and working hours. In view of the present unemployment situation, four 6-hr. shifts are being developed as standard working hours. The attempt is being made to establish a standard class wage for each job; this will later be used in determining proper incentive rates.

Standard rates for standard outputs are being developed and attention is being given to both financial and non-financial incentives. Operating reports, distributed to each department head every morning, show the labor costs and yields of his department for the previous day compared with the standard.

### Revision of Standards to Be Expected

In conclusion, Mr. Clark stated that any standard is better than none at all. There should not be too much delay for the sake of accuracy, as it is probable that standards will be changed later.

A discussion of this paper, prepared by E. P. Blanchard, assistant sales manager, Bullard Co., Bridgeport, Conn., and presented by Dr. H. S. Person, managing director of the society, compliment Mr. Clark on attempting to introduce the principles of standardization in wrought iron production. It was stated that performance standards, especially in industries of this type, are subjected to many variable conditions and methods changing in accordance with fluctuating production volumes. In further discussion of the paper, King Hathaway, consulting engineer, Manning, Maxwell & Moore, Inc., New York, said standardization as adopted by Mr. Clark's company included all the principles of modern scientific management as exemplified by the so-called Taylor system.

### Standard Costs Are Guide to Future of Business

The important service of standard costs to business and industry as a guide to future action was stressed at another session by Mr. Harrison. Especially in the matter of selling costs, he said, are they being used in these days of business depression to increase sales volume. There is, he pointed out, no fundamental difference, of course, between a budget system and a standard cost system, except that the former term is usually applied to a forecast of expenditure and income, whereas a modern standard cost system based upon sales quotas, standard selling and administrative costs and standard factory costs is scientific.

In the most recent development of standard costs, Mr. Harrison said, profit objectives are automatically adjusted to conform to changes in general business conditions. In one business, for example, a study of its past sales showed that over a ten-year period fluctuations in sales directly followed fluctuations in the tonnage of steel ingots produced in the United States. The standard sales figure for that company is adjusted monthly to conform to the current index of steel ingot production and the standard profit figure modified to reflect the revised sales figure.

## NEW OFFICERS

PRESIDENT: Sanford E. Thompson, Thompson & Lichtner Co., Boston.

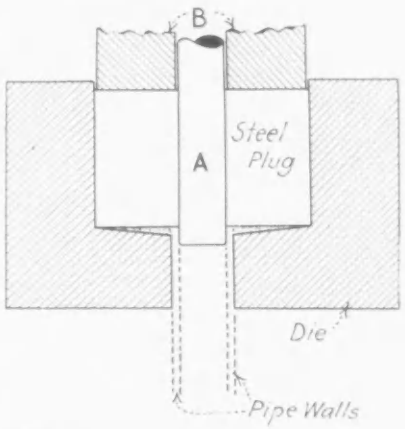
VICE-PRESIDENT: William H. Leffingwell, W. H. Leffingwell, Inc., New York.

TREASURER: Edward W. Clark 3d, (re-elected), E. W. Clark & Co., Philadelphia.

DIRECTORS: George E. Fraser, Fraser & Torbet, Chicago, and Mary Gilson, University of Chicago.

# Advance in Steel Mill Practice in Europe

CAREFUL study of progress being made in many lines of steel mill activity has been made, year after year, by Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh. He has formed the habit of visiting Europe during the summer and spends the greater part of his time in studying what is being done there. At the meeting of the Ameri-




A plug of hot steel is pierced by plunger A, then forced down through die by action of annular plunger B.

can Society of Mechanical Engineers at New York, the first week in December, he gave a résumé of what he saw during the summer of 1931. Much of this is covered in abstract in the following paragraphs.

For some years it has been the practice in the plant of Mannesmann Brothers, makers of seamless pipe, to rust-proof their pipe with a form of Bakelite which has to baked on. This baking process was found to be somewhat injurious to the pipe and a new scheme has now been devised. The pipe is now covered inside and out by a form of chlorinated rubber in a solution which can be brushed on, and sizing material is used, about five times as much as the chlorinated rubber.

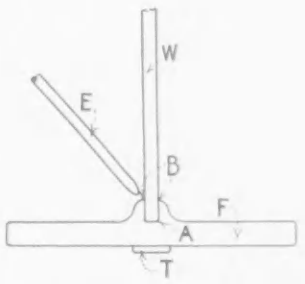
This covering protects the pipe against both acids and alkalis, whereas the Bakelite protected against acids only. Building walls and other surfaces have been coated in this manner, also particularly where acids or other attacking agents have been troublesome. This has done away with much of the expense of maintenance against corrosion.

## → *Extruding Steel Tubes*

EXTRUSION of seamless steel tubes has been perfected by Mannesmann Brothers and the process is in commercial operation. It took several years of experimentation to overcome earlier troubles with the die and the plunger. Steels have now been developed, and the design has been so perfected, that a die will last for about 500 tubes and the plunger for 900 tubes. Tubes of 2¼-in. outside diameter and 20 ft. long are extruded in 2 sec. and the operating rate is about 90 tubes an hour.

A plug of steel at 2200 to 2300 deg. F. is inserted into the die, whereupon an inner-plunger *A* comes down through it, making a hole, as shown in the sketch. Then an outer plunger *B*, annular in form, is brought down, exerting a pressure of about 100,000 lb. to the square inch, over the entire area of plastic steel. This forces the steel down through the orifice between the die opening and plunger *A* and forms the tube.

Only a slight amount of steel is left as a ring or collar at the top of the tube (shown stippled). This is cut off by a special cutting tool or die, which is run down quickly immediately after plunger *B* has been withdrawn. The tube drops out at the bottom, while the collar adheres to the cutting tool and is withdrawn at the top. Then




Resistance welding at A and fusion welding at B join the web to specially rolled flange in making wide-flanged beams.

plunger *A* is withdrawn, another plug of hot steel is inserted into the upper portion of the die and the process is repeated.

### Producing Small Pipe

These tubes are being manufacturd, among other things, into ⅜-in. gas-pipe, by being reheated and then run through a continuous reducing mill, from which they come out at 3000 ft. a minute. A new press now being installed is designed for producing 4-in. tubes, which will be rolled down to smaller sizes without reheating.

Seamless tubes made by customary methods have been bought because of the fact that their being seamless was a practical guarantee of the highest grade of steel material. Piercing the ingots with a plunger, either in the extrusion method or in another method which has developed in Germany, obviates the necessity to use steel of such high quality. In the second method the former piercer is now used as an expanding mill, by means of an appropriate inner mandrel.

## *Rolling Seamless Drums*

SEAMLESS drum as much as 22 ft. long and 44 in. in diameter, with walls running to 3 in. thickness or more, are being made regularly by the United Steel Co. in Germany. As the work is now done, the thinnest wall feasible with this process is 1 3/16 in. thick; this, because of the impossibility with thinner walls of keeping the steel hot enough during the rolling process.

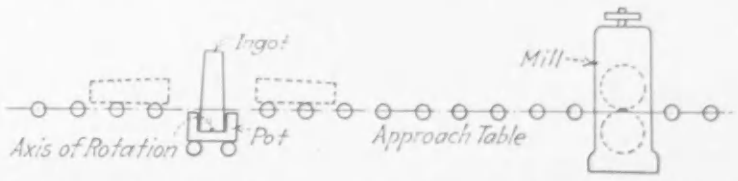
This steel is rolled by what is known as the Roechner mill, with six rolls inside and six rolls outside, all with axes slightly inclined to the axis of the drum. This inclination affords a kneading operation somewhat similar to peening, and at the same time imparts to the drum an advancing motion. In this manner the original 5 or 6-ft. length of the drum is brought out to the 22-ft. final length, or whatever length may be required, without increasing the external diameter. A new arrangement is under way whereby a hollow-cast ingot, or one which is cored out, will be rolled on this mill.

## *Fabricating Wide Beams by Welding*

WIDE-FLANGE beams are in very small use in Germany. Of the structural steel order for a building, they may represent from 5 to 8 per cent of the tonnage, against, in some instances, 65 to 75 per cent of the tonnage in the United States. Consequently they are customarily not rolled.

They are built up by electric welding in the manner shown in the sketch. The flange *F* is rolled with the central lips as shown. Then the web *W* (a steel plate) is inserted and, by means of an electrode *E*, and another terminal *T*, the weld is made on both sides of the web. This results in resistance welding at *A* and fusion welding at *B*, and the cost is permissible because of the small quantity of this material used.

Blowing blast furnace dust back




In this arrangement the ingot may be discharged in either direction upon approach table. If tilted to left, ingot pot is then up-turned, providing rollers to bridge the gap.

into the furnace below the stock line, with the aid of compressed gas, is being performed commercially in Germany. This avoids the cost of sintering and avoids also all necessity for transporting the material to and from the sintering plant.

### *Rolling an Ingot Butt-End First*

BLOOMING mills sometimes find it desirable to roll an ingot with the big end closest to the shears. This is being done in Germany by means of the device shown in the sketch, whereby the pot in which the ingot is delivered to the blooming mill approach table can be tilted in either direction, according to which way the ingot is to be rolled.

If this is tilted to the left, so that the big end of the ingot will reach the mill first, the pot is then reversed upon its axis, presenting a pair of rollers (normally on the bottom) which then fit in with the table rollers on either side and pass the ingot to the mill without interruption. The advantage of this method of rolling lies in the ability to get the initial full-size cuts from the bloom starting immediately after the small end crop, and leaving the uncertain final bloom length at the top of the ingot, instead of the bottom, with consequent advantage in percentage of yield of sound steel.

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## Iron Ore Imports Shrink; Smallest Since May, 1922

Imports of iron ore into the United States in October are reported by the Department of Commerce at 70,022 gross tons. This is the smallest amount for any month since May, 1922, and represents a drop of nearly 30 per cent from the 99,124 tons imported in September. The October total was less than one-half the 186,396 tons of a year earlier.

In the ten months elapsed, exports have totaled 1,281,736 tons, which amount is less than one-half the 10-month total in 1930, and is the smallest such figure since 1922.

As has been customary for a long time, Chile led as a source of imports, furnishing approximately 65 per cent of the total in October and 53 per cent in the 10 months. This compares with about 70 per cent in October, 1930, and 59 per cent in the 10 months of that year.

Cuba was in second position in October, with Russia third. In the 10 months Russia was by a large margin in second position, with Cuba third and French Africa, Sweden and Spain following, in that order.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

| | October | | Ten Months Ended October | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Chile | 45,276 | 132,875 | 682,787 | 1,340,450 |
| Cuba | 11,000 | .... | 78,000 | 190,654 |
| Spain | .... | 6,700 | 38,191 | 74,978 |
| Sweden | .... | 7,205 | 58,022 | 187,116 |
| French Africa | .... | 8,000 | 65,172 | 218,375 |
| Canada | .... | 39 | 584 | 395 |
| Russia | 8,667 | 8,999 | 237,306 | 229,017 |
| Other countries | 5,079 | 22,578 | 121,674 | 144,317 |
| Total | 70,022 | 186,396 | 1,281,736 | 2,584,402 |

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## Steel Boiler Business Lower in October

WASHINGTON, Dec. 8.—Orders for steel boilers in October totaled 672 units of 467,375 sq. ft., against 893 of 692,238 sq. ft. in September, according to reports made to the Bureau of the Census by 73 manufacturers. Orders in the first 10 months of the current year totaled 7117 boilers of 6,411,257 sq. ft., compared with 11,575 of 12,173,518 sq. ft. in the corresponding period of last year.

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## Steel Barrel Output Higher in October

WASHINGTON, Dec. 8.—Production of steel barrels in October rose to 489,555 units, or 35.3 per cent of the capacity of the 32 plants reporting to the Bureau of the Census, from 451,562, or 31.7 per cent of capacity, in September. Shipments increased to 492,145 from 452,960 and stocks declined to 34,704 from 37,294. Unfilled orders dropped to 638,000 from 914,303. Those for delivery within 30 days fell to 177,673 from 205,676, while those for delivery beyond 30 days decreased to 460,327 from 708,627.

Output in the first 10 months of 1931 totaled 5,148,945, against 6,526,069 in the corresponding period of last year, while shipments were 5,182,644, compared with 6,527,635.

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## Production Control Plans to Be Demonstrated

Examples of production planning and control in mass production, job order and modified mass production plants will be given at a conference to be held under the auspices of the American Management Association at the Van Cleve Hotel, Dayton, Ohio, Jan. 19 and 20, 1932.

The forms and methods for the mass production plant will be presented by a group from the National Cash Register Co., under the direction of R. F. Whisler, head of the standards department. The job order description will be based on the methods followed by the Gleason Works, Rochester, and will be presented by a group organized by A. E. Crockett, secretary, industrial management council, Rochester Chamber of Commerce. Modified mass production plant procedure will be demonstrated by a group headed by C. S. Craigmile, general superintendent, Belden Mfg. Co., Chicago. Two papers are planned for the dinner meeting on the evening of Jan. 20. A number of plants will be open for inspection.

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## Freight Rate Changes Suspended Until July 3

WASHINGTON, Dec. 8.—The Interstate Commerce Commission has ordered suspension until July 3 of a number of tariff schedules which otherwise would have become effective Dec. 3, applying to Eastern and Western territories. Among rates suspended were those on iron and steel pipe and fittings in carloads throughout Western Trunk Line territory.

It had been proposed to cancel commodity rates and establish a basis of 32½ per cent of first class rates. Schedules proposing to revise class and commodity rates applicable by way of Lake Michigan or Lake Superior ports on rail and Lake and rail-Lake-rail traffic both eastbound and westbound, between Eastern and Western points, also were suspended.

Other tariffs suspended included those which proposed to substitute the Southern scale of class rates in place of the class rates applicable in Official Classification territory between Georgetown, Paris and Walton, Ky., and points in the Buffalo-Pittsburgh, Eastern Trunk Line and New England territories.

Many of the increased rates, however, were allowed to become effective.

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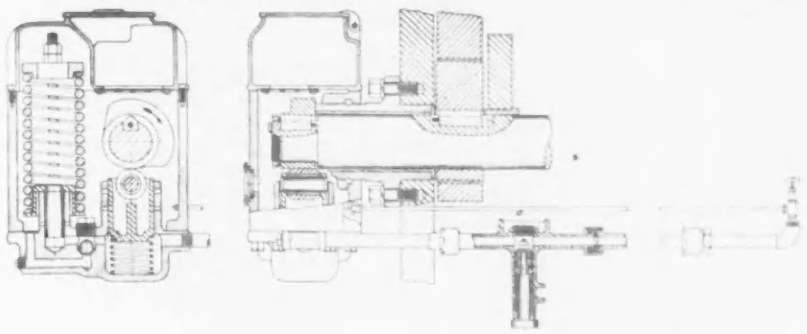
A new technical bulletin on forging is now available. F. J. Rutledge, chairman of the committee on industrial gas research, American Gas Association, announces that the metallurgical phases of the research in the application of gas heat to forging have been completed and that the results are set forth in a bulletin entitled "The Influence of Atmosphere and Temperature on the Behavior of Steel in Forging Furnaces." This research has been carried on during a period of a little more than four years and has been conducted under the supervision of the committee on industrial gas research by the department of engineering research at the University of Michigan.



# Hydraulic Hold-Downs Used on Cincinnati All-Steel Shears

TO the use of hydraulic hold-downs is attributed the unusual speed and accuracy of the new all-steel squaring shear built by the Cincinnati Shaper Co., Cincinnati, and described at length in THE IRON AGE of Oct. 29, page 1125. In view of its importance, a description of this device for clamping the steel sheets during the cut will be of general interest. This hydraulic hold-down mechanism, illustrated herewith, develops the high clamping pressure necessary for accuracy without marking the sheets and permits operation of the heavy shears at the rate of 60 strokes a min.

A hardened and ground steel cam on the end of the eccentric shaft actuates a piston in a master cylinder that forces oil to the hold-down plungers, which are placed at 12-in. intervals. This oil pressure is regulated by a spring accumulator which also acts as a relief valve. Each plunger delivers the same pressure regardless of its downward travel. If a sheet varies in thickness, the low points will be clamped with the same pressure as the high points; or if two operators are working side by side, each cutting short pieces of different gages at the same time, the hold-downs will grip each sheet with the same clamping pressure.

The cam which actuates the piston is so designed that the instant the knife bar completes its downward travel, the piston is allowed to rise, the oil pressure drops, and the plungers are immediately retracted by springs. There is a spring in each hold-down bracket. Operation of the hold-downs is thus independent of the upper knife so that the sheet is released and the operator can prepare for the next cut while the knife is still traveling upward.

Regulation of the accumulator to deliver different pressures to the hold-downs is provided by two simple adjusting nuts. This adjustment is important, as it is often necessary to vary the hold-down pressure, particularly when cutting hard-alloy steel and duralumin sheets. The pressure used to clamp a hard sheet will mark a softer one. Each plunger delivers a maximum of 2000 lb. pressure, making a total of 24,000 lb. for a 12 ft. sheet. Sheet slippage during a cut is eliminated.

As the plungers are located close to the cutting edge of the knives waste is prevented and narrow strips can be cut. On smaller sizes the plungers are ⅝ in. from the edge; on others, ⅞ in. Heavy hold-down pressures make it possible to place the hold-downs close to the cutting edge without having the sheet tilt.

The hold-down bar is stationary; only the plungers move to clamp the sheet. This feature contributes to the speed of the shear. Since the moving parts or plungers are relatively light in weight, they can operate rapidly, without marking the sheets or the table.

Each hold-down plunger carries two cup packings of molded mineral-tanned leather. The valve shown at the right in the illustration is opened to allow air to escape to the reservoir when filling the system. Each hold-down is a separate assembly and may be removed from the machine without disturbing the other units. The company reports that the hold-downs have been tested under continuous operation at high pressures for 3000 hr.

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## A New Ceramic

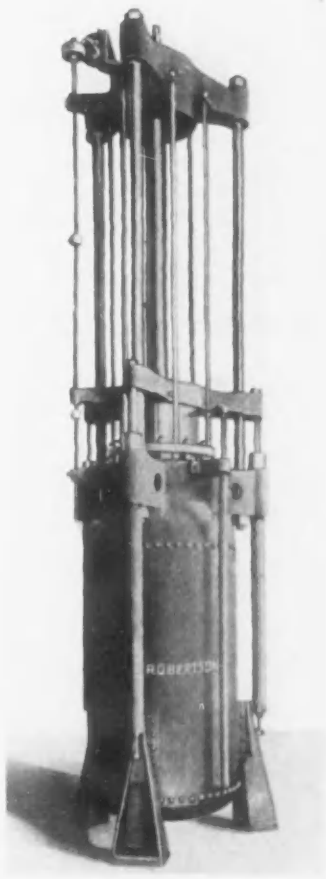
Henry L. Crowley & Co., West Orange, N. J., announce a new ceramic, having a coefficient of thermal expansion of 0.9 at temperatures ranging from 0 to 100 deg. C., and 1.2 from 0 to 200. At high temperatures, or up to 1000 deg. C., the coefficient of thermal expansion is 2.7. It will be known as Crolite No. 7.

The new ceramic has certain critical applications, such as in precision instruments where changes of material must not upset characteristics. Also, it may be employed for spark plug cores and other uses, particularly pyrometer tubes, where heat shock is severe.

## New Hydro-Pneumatic Accumulators

HYDRO-PNEUMATIC accumulators requiring comparatively low air pressures—175 lb. per sq. in. maximum—have been placed on the market by the John Robertson Co., 121 Water Street, Brooklyn, N. Y. They are offered in sizes ranging from 96 gallons at 1500 lb. per sq. in. to 2½ gallons at 6000 lb. per sq. in. The air tank forms the base of the accumulator. The hydraulic ram is supported by the crosshead above and the hydraulic cylinder and air ram float on the air pressure, being guided at the bottom of their respective glands and at the top by the intermediate platen. This platen, in turn, is guided throughout its vertical movement. Both rams are outside packed with square flax packing; the hydraulic cylinder is bronze bushed and has a bronze packing gland.

Automatic control of the supply pump is provided by a limit switch



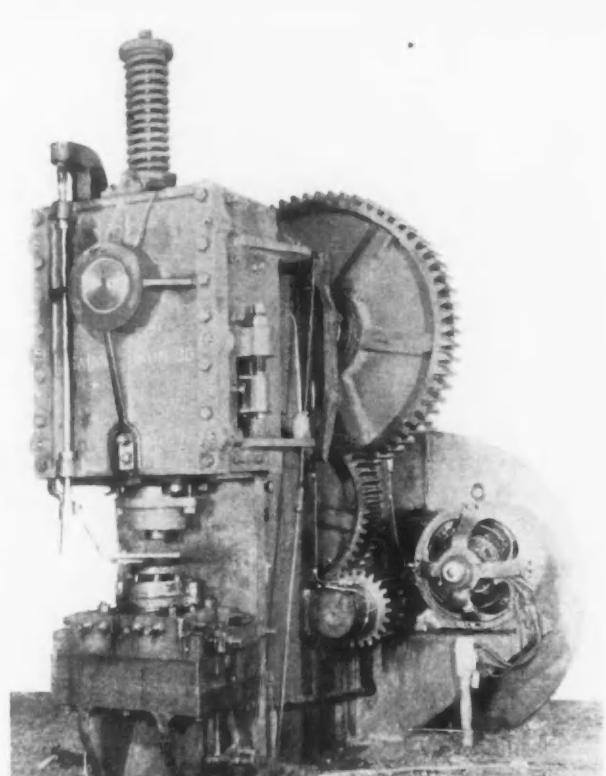
and tell-tale rod. A by-pass vent safeguards the accumulator from possible failure of the limit switch. Operation of the by-pass, except when necessary, is prevented by cushion springs. Air pressure in the air cylinder and storage tanks is maintained automatically by an auxiliary air compressor with automatic control.

# Washer Punch Press of All-Welded Steel

THE heavy-duty punch press here illustrated develops a ram pressure of 525 tons and is capable of cold-punching, at one stroke, complete washers up to 6-in. outside diameter and 3-in. inside diameter, from rolled steel plate up to ⅝ in. thick. It was designed and built by the Reading Iron Company's heavy machinery and hydraulic equipment department, Reading, Pa., in cooperation with the development and research division of Lukenweld, Inc., Coatesville, Pa.

Important parts of the press, including the housing, outboard bearing-stand assembly, gears, pinions and flywheel, were fabricated by gas-cutting, forming and arc-welding of steel plates and slabs. Savings of more than 2½ tons in the total weight of the press are claimed for this method of construction. In addition, the housing or main frame and other parts are comparatively free from stress concentration, and possesses the required rigidity and strength to prevent spring in the frame.

The flywheel operates at the higher speeds safely obtainable due to the homogeneity of the rolled material. Drive is by a 25-hp. motor with a speed range for operation at 40 r.p.m. maximum for small washers and 20 r.p.m. for large washers. A mechanism is provided which ejects the punched washers from the dies and places them on a throw-out arm, from which they are deposited in a receptacle at the side of the machine. The press is now in service at the plant of the By-Products Steel Corpn., Coatesville, Pa.



WELDED steel construction has resulted in important weight savings without sacrifice of strength and rigidity.

# New Flash Welder with Hand or Power Drive

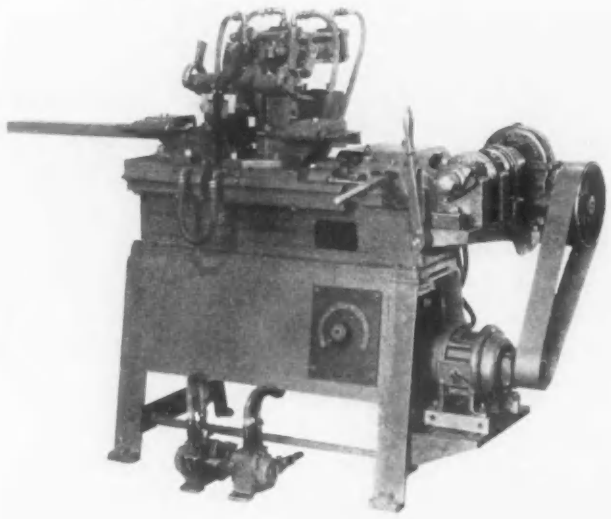
A NEW flash welder, brought out by the Thomson-Gibb Electric Welding Co., Bay City, Mich., and known as type F13-60, can be furnished with hand toggle push-up and hand clamps, or with motor driven power push-up and air clamps, as illustrated, that make the welding cycle automatic. Machines arranged for hand operation can subsequently be fitted with the power equipment, it is pointed out.

Current timing for the power-driven welder is controlled by fan cams which turn the current on and off at the proper moment. When operating at 12 r.p.m., this machine has a maximum capacity for ½-in. diameter stock, or ⅜-in. diameter stock when operating at 18 r.p.m. Joints in pipe or tubing up to 1⅝ in. outside diameter can be welded; and, when equipped with the standard hand toggle push-up, the machine will take rounds up to a maximum diameter of 1 in.

The controls include a push-button operating magnetic wall switch with adjustable automatic current cut-out mounted on the welder. A five-point switch mounted on the welder provides current variation for different sizes of stock.

The transformer is mounted out of the line of the flash and dirt from the weld; further protection is afforded by a sheet metal guard. It is water-cooled and has a 60 kva. capacity, standard wound for either 220, 440 or 550-volt, 60 cycle current. Transformers for 25 or 30-cycle operation can be furnished on special order. The position of the transformer is such that units having capacities up to 100 kva. can be installed without disturbing the balance of the machine.

Hard-rolled copper, cast copper, bronze or steel dies are supplied, according to the type of work to be done. Overall dimensions of the welder are 70 x 90 x 67 in. high. Equipped with hand clamps and hand push-up, the machine weighs 1600 lb.



MOTOR-OPERATED push-up and air clamps have been installed on the machine illustrated to make the welding cycle automatic.

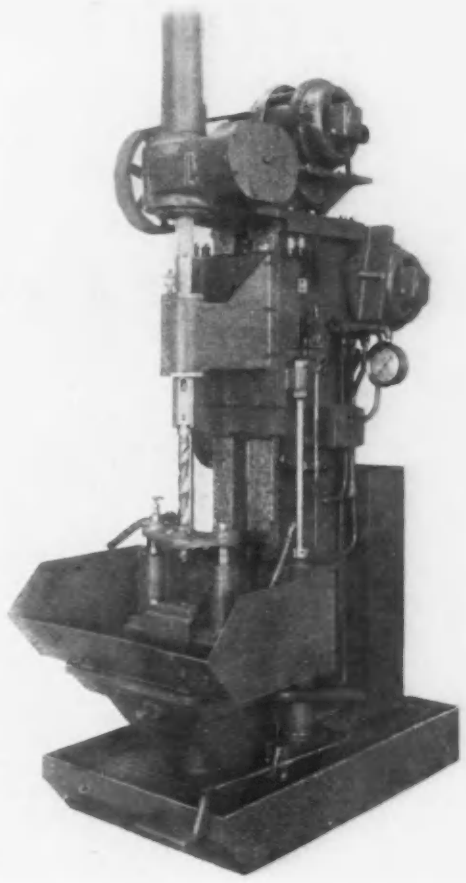
# Single-Spindle Boring and Drilling Machine

ADAPTED for either single-spindle drilling or boring as illustrated, or for use with an indexing table for successive operation on the same piece, a new hydraulic feed machine designated as No. 4-VH has been placed on the market by Baker Brothers, Inc., Toledo, Ohio. A large saddle, sliding on scraped ways and carrying the head mounting, is actuated by the company's patented "twin pull" hydraulic feeding mechanism which comprises two cylinders working in unison, one on each side.

Drive is by V-belts from the motor to a drive bracket carrying four gears —a pair of spiral bevels and two slip-change spur gears to give various speeds. The gears are made of alloy-steel, hardened and ground. Shafts are mounted on ball bearings and automatic lubrication is provided. Available speeds range from 46 r.p.m. (corresponding to a cutting speed of 60 ft. per min. on a 5-in. diameter) to 836 r.p.m. (corresponding to a cutting speed of 70 ft. per min. on a 5/16-in. diameter). The spindle drive will transmit up to 10 hp.

At its upper end, the spindle is splined to S.A.E. standards; it is mounted on preloaded ball bearings having capacity for thrusts up to 10,000 lb. In addition, there is a large radial-thrust ball bearing in the upper bearing of the head housing. On single spindle machines the spindle-end is fitted with No. 5 Morse taper and the Baker company's standard drive slot for boring and facing cutters, etc.

**DESIGNED** *to combine* strength and simplicity with flexibility of operation. The set-up illustrated is for drilling an automobile cluster gear.



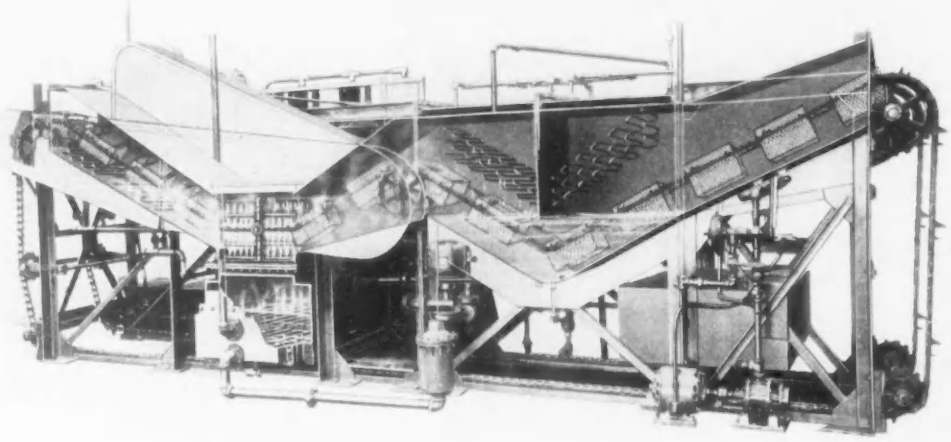
Hydraulic pressure for feeding is supplied by a constant-delivery pump mounted in the main frame and driven by an independent motor. The frame also contains an oil sump of ample size. The operating cycle is automatic; depressing the foot treadle operates a control valve, the spindle moves down at a rapid traverse of 120 ft. per min., trips into feed at any predetermined point, drills to depth and then automatically returns to the upper position. Rate of feed can be changed instantly by means of a control box.

The plain table shown on the machine illustrated has a vertical adjustment for setting to any desired height. A box-type indexing table can be furnished for multiple operations. Both types are provided with large pans to catch chips and cutting lubricant.

# Special Machine Locates Spokes of Wire Wheels

INCREASED speed and accuracy in the production of wire wheels for automobiles has been obtained by the Budd Wheel Co., Philadelphia, through use of a newly developed machine which simultaneously locates the position of all spokes on the wheel rim. Indentations made by the machine in the rim are subsequently pierced by a punch which is centered in each indentation.

The machine illustrated is for forty-spoke wheels. It carries ten punch segments mounted on a massive ring; each of these outer segments has four buttons accurately spaced as required to locate the spoke ends in the rim. Corresponding die segments are mounted on an inner ring over which the rim is placed before the forming operation. When the machine is put in operation the buttons are pressed into the rim by the action of toggles which actuate the outer ring of segments.



WORK enters at left, passes through a fog of solvent, thence under powerful streams of boiling solvent and through a hot rinsing bath, coming out dry at right end.

# Conveyor-Type Washing Machine for Metal

A HOT solvent process for cleaning metals and alloys is offered by Rex Products & Mfg. Co., Detroit.

Known as the S-M system, the new method makes use of an especially prepared cleaning liquid, Perm-a-clor, which is non-explosive and non-inflammable. Perm-a-clor is said to dissolve oils many times more rapidly than gasoline, kerosene, benzene, oleum spirits or alcohols.

Perm-a-clor is used in a machine as shown. The work, on a conveyor, enters a compartment where it is drenched with a heavy fog of the solvent. This loosens the foreign material and prepares the work for powerful streams of boiling solvent, pumped at 35 lb. pressure, which strike it from all directions and remove the dirt and oil. The work then passes along the conveyor and is rinsed in a bath of distilled, hot solvent, after which it leaves the machine clean and dry.

Being permanent as well as acid-free, Perm-a-clor can be used over and over. It is said that the total amount of solvent in the machine may be distilled in less than an hour, and the accumulated dirt, oil and other foreign matter removed, leaving the clear, distilled solvent for further use.

This method is said to leave no residue on the surface of the metal to slow up or interfere with subsequent operations, such as pickling, plating, enameling, vitreous enameling or rust-proofing. The characteristics of Perm-a-clor and the provision of the condensers in the solvent machine prevent excessive loss of material by evaporation.

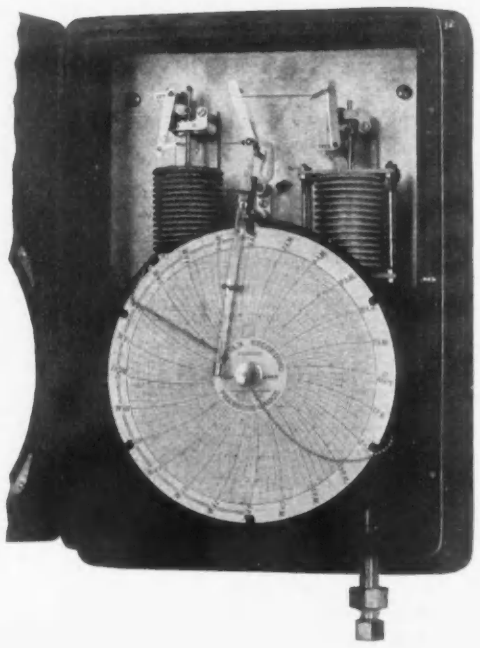
For removing heavy lubricating oils from machined, stamped or quenched parts; preparing metals for plating, vitreous enameling, paint, lacquering or other surface coating, as well as for preparing zinc, aluminum, die-casting and other soft metals for subsequent operations, which are affected by alkali cleaners, this process is recommended by the manufacturer.

The solvent machine may be made to fit into regular production schemes, and placed at the point where cleaning is needed. Design and construction of the machine are very flexible, making it possible to effect time space and labor savings.

# Recording Gage Reads in Absolute Pressures

AUTOMATIC compensation for barometric pressure changes is provided by the recording vacuum gage here illustrated, which records absolute pressures directly without requiring correction for variation in the barometer readings. The instrument, which is of the single pen, recording type, has been developed by the Bristol Co., Waterbury, Conn., for use in production processes where the maintenance of a definite degree of high vacuum is an important factor. It is designed to eliminate the possible confusion and delay resulting from applying barometric corrections to vacuum readings.

Gages of this type can be furnished for ranges as low as from 0 to 50 mm. head of mercury pressure absolute or equivalent. The actuating mechanism consists of two sensitive diaphragm elements, one connected to the vacuum line and the other directly affected by barometric pressure variations. The resulting movements from these elements are carried by a differential transmitting linkage to the pen arm which records on a suitable chart. An all-metal case is furnished, either for surface or flush mounting.



ABSOLUTE pressure gage with case opened to show operating mechanism. Two sensitive diaphragm elements connected by differential linkage give readings independent of barometric variations.

# Price Structure Shows Much Weakness

By DR. LEWIS H. HANEY

Director, New York University Bureau of Business Research

BRADSTREET'S index, a sensitive but well-proved indicator of commodity price trends, reached a new low point for the recession on Dec. 1. Even wheat and silver have lost a large part of their speculative gain. Lead, copper and zinc are at or near the lowest in many years. Cotton, wool and silk markets are weak, with no prospects of sustained recovery.

Reasons for this trend in commodity prices: In the first place, there are extremely large stocks of various raw materials. The "holding" movements of the past year or two have meant an accumulation of stocks. Buyers are aware, and their bids are affected by the knowledge, that there is plenty of reserve supply. In the second place, much over-capacity in numerous industries has tended to limit the curtailment of production, and to keep sufficient pressure on weak markets to keep them weak. The tendency to disregard the complete cost of production is strong when overhead or general charges are large.

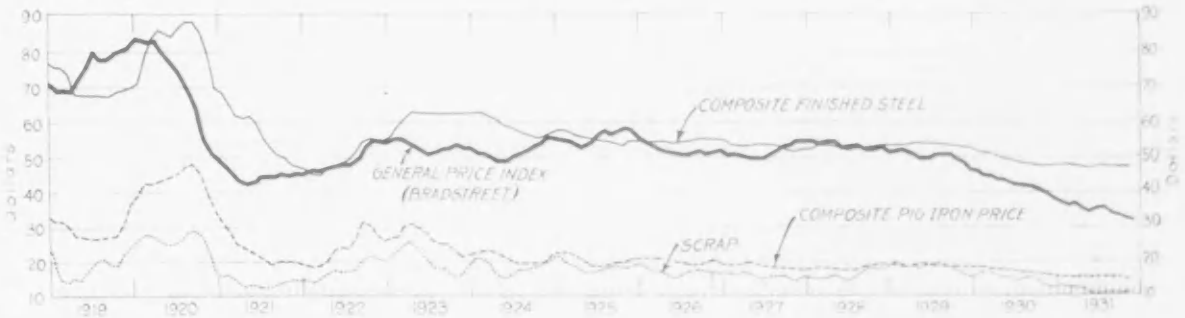
As a result, margins of profit in many industries are meager or entirely lacking. This suggests the weakness of demand as a market force. The prices buyers are willing or able to pay are low. Despite the decline in production in most industries, prices have tended to drop, which clearly indicates that bids have been reduced.

The consumer is working part time or at a reduced income; some of his bonds have defaulted and he has lost money in the stock market. The future looks uncertain to him. He therefore decides to use the old car another year. We may note, too, that the so-called "American standard of living," while it is just as American, is not of the America of 1929. As a result the automobile company makes not much more than enough cars to supply its dealers with samples. It endeavors to give more car for the money, or even cuts the price. Thus it buys little steel and wants lower prices on what it does buy.

Meanwhile, the demand deposits of the banks, a factor often related to commodity price levels, continue to decline. Such deposits have fallen sharply and with little interruption during the past five months. And the volume of bank checks drawn has declined even more sharply than deposits, indicating continued reduction in the deposit turnover.

It may be suspected that business of all sorts, even including the hard-pressed railroads, is about to learn that neither capitalization nor "investment" is sacred. Neither is guaranteed by society. If so much capital is invested that products cannot be sold at a profit, because of overproduction, a part of the investment must be written off.

In the case of the large stocks of cotton or copper, many persons are willing to admit that the cost of producing the surplus held in storage is no longer significant as a market force, and that the price must be low enough to move the goods. But is there not too much plant and equipment in some industries? Does the cost of the investment have anything to do with its value now? Must it not be written down to a closer relation with what it can earn, at a level of prices which measures the exchange value of commodities in terms of a deflated currency?




There is further spread between the Bradstreet index of commodity prices and finished steel prices. Scrap and pig iron and finished steel have gone lower; but not so fast as general prices.

# This Issue in Brief

Engineers are not "time clock punchers" but unless careful records are kept of cost of design this item may "eat up" the profits. Engineering department's labor should be charged directly against the work.—Page 1476.

* * *

**Metal finishes of unusual toughness** are obtained by using synthetic resins. Metal windows withstand a 72-hr. salt spray test. A finish used on washing machines endures up to a 5 per cent caustic solution for 12 hr. or more.—Page 1482.

* * *

**High-nickel alloys are weak and brittle between 1450 and 1650 deg. F.** Both above and below this hot short range these alloys regain normal strength and ductility.—Page 1489.

* * *

**To prevent buckling when welding high-nickel sheets**, take time to jig properly. The jig acts as a chill, absorbing heat that would otherwise work into the sheet and warp it.—Page 1489.

* * *

**Commodity price index reaches a new low** for the recession. Stocks of most raw materials are extremely large. Over-capacity in many industries has limited the curtailment of production.—Page 1503.

* * *

**Ford shows tangible signs of an awakening.** Some parts makers have had shipping releases. Steel trade is nervously awaiting contracts for first quarter.—Page 1509.

* * *

**Shaking the ingot gets gases out faster.** Segregation is smaller. The steel rims better and faster. Chipping cost is low.—Page 1492.

* * *

**Confusion surrounding the selection of tool steels** can be eliminated by expressing physical properties in numerical values, says metallurgist. Why not catalog the characteristics in comparable figures as is done in the case of structural steels?—Page 1488.

* * *

**Tungsten-carbide-tipped milling cutters** should be made with inserted blades. Correct cutting angle is obtained by proper placing of the cutter blade with respect to the cutter body, rather than by grinding the angle on the blade.—Page 1479.

* * *

**Small jobbing foundries can save money** by mechanical handling. Sand-handling system may be the same as that used in continuous foundries. Instead of the continuous mold conveyor, lines of gravity rolls, set at right angle to the line of molders, may be used.—Page 1491.

* * *

**Aluminum paint finish weighs only one-sixth** that of white lead. Two quarts of long-oil synthetic resin mixture per pound of ground aluminum provides a surface coating of long-enduring brightness.—Page 1534.

* * *

**Pouring with two nozzles reduces teeming time** more than 50 per cent. Time is 70 min. with one 1¾ in. nozzle, and only 30 min. with two, as sluggish action at the end of the period is avoided.—Page 1492.

* * *

**Seamless pipe can be protected against acids and alkalis** by brushing inside and out with a solution of chlorinated rubber.—Page 1497.

* * *

**Calls stabilization through trade associations** "an extreme symptom of capitalistic self-defense." Its purpose is to check the process of competitive confiscation, which is the capitalistic system's only automatic safety valve; also, it sterilizes the element of technological improvement, says economist.—Page 1495.

* * *

**Pickling costs cut** by use of modern equipment. Tanks are lined with acid-proof, quick-setting cement. Pickling solution is sprayed off, rather than rinsed off. Bath temperature is automatically controlled.—Page 1485.

* * *

**Rushing the pickling process is prevented by locking the temperature control instruments** in a closet. The foreman keeps the key so that operator cannot run up the heat to hasten the process and thus maintain a high production record at the expense of quality.—Page 1486.

* * *

**"Tucking in" solves surplus metal problem in deep drawing.** Deep-drawn automobile spoke is finished to rectangular shape, which must then be tapered. Four corners are tucked in by means of a semi-automatic cam-type die, bending in the edges and causing the rectangular end to take a wedge-shape form.—Page 1534.

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**Not since 1905 have iron and steel exports reached the low total** of 59,335 tons shipped in October. October machinery exports ($20 millions) were lowest for any month since February, 1923.—Pages 1508 and 28.

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## NEXT WEEK

THE pressure for economies is forcing designers, producers and users of equipment to search as never before for hidden sources of loss. Precise measurement with electrical instruments offers an excellent method of uncovering features in design or operation that need correction. Practical applications of such instruments will be described in our next issue. ▲ ▲ ▲

# Decentralization of Industry Urged at Housing Conference

## Reform in Railroad Rate Structure Suggested as One Move Toward Re-Location of Manufacturing Plants

WASHINGTON, Dec. 8.—With a view to desirable decentralization of industry and to relief of housing congestion, reform in the railroad rate structure was urged upon the President's Conference on Home Building and Home Ownership at its meeting here Dec. 2-5 by the Committee on Industrial Decentralization and Housing.

The committee is headed by Stuart W. Cramer, Cramerton, N. C., member of the executive committee of the Cotton Textile Institute. Among other members of the committee is George M. Verity, chairman of the American Rolling Mill Co., Middletown, Ohio. The committee is one of 32 making up the conference which submitted a volume of reports and recommendations looking to stimulation of home ownership.

The proposals covered a broad list of suggestions, such as finance, the establishment of a national institute, community planning, taxation, repair and modernization of homes, support of plans of the administration for Government aid through the setting up of a chain of 12 home loan banks, etc.

In its report, the committee on industrial decentralization and housing said that the railroad rate structure of the nation should be such that industries are as free to locate in the country as in the city. It pointed out that there should be currently in effect to and from a small center of population, at least in general, rates suitable to move the traffic if an industry locates there. To the extent that this may not be practicable, the committee said, the policies and methods of rate making should be so definitely settled that the industrialist may secure the rates without loss of time and hazard to his investment in the uncertainties of litigation.

### Switching Limits Should Be Enlarged

"Similarly the industries should be free to locate in the region of a large city instead of in the congested area," the report stated. "The switching limits should be enlarged, and the switching practices and charges should be devised to facilitate the growth of a large city along the lines of city and regional planning.

"The historical development of the railroad rate structure has been one which has strongly tended to force industry to locate in large centers. It seems likely that we are on the verge of far-reaching changes in the equipment and operation of the railroads. The policies of rate making should be specifically developed and quickly. The committee feels that the Interstate Commerce Commission should consider the national policy as to the freedom of location to industry, and that it should enter upon a study of the relation of the bases of rate making to that national purpose."

### Housing Developments Commended

The committee declared that the most successful cases of movement of industry appear to have been where manufacturers have had sufficient capital to build dwellings for their work people. It seems advisable, therefore, it was stated, to provide industrial village communities wherever possible. It pointed out the advantage of the satellite suburb or garden city which relieves the worker from dependence upon one industry. In general, the committee stated, the movement of manufacturing plants to open districts or small towns is retarded as the result of the absence of housing.

The committee listed four main reasons why managements of companies engaged in housing activities for their employees.

Necessity of providing shelter to secure labor.
Inadequacy of available housing.
As a special inducement to valued employees.
Because of a belief that well-housed and preferably home owning people make more efficient employees and better citizens.

Feeling that more can be accomplished in the direction of industrial decentralization when the economic forces determining the present distribution of industry and population are better known, the committee recommended a number of subjects for future research.

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# Commerce Commission Revises Rates on Pig Iron, Scrap, Etc.

## Agrees to Changes Suggested by Railroads in 15 Per Cent Case—Advances May Become Effective Jan. 1

WASHINGTON, Dec. 8.—Changes made by the Interstate Commerce Commission in its supplemental report of yesterday in the 15 per cent rate case will increase rates on iron ore, coal and steel mill scale 6c. a net ton. Rates on pig iron and scrap will be increased 12c. a ton.

Under its original decision, the commission proposed increases of $3 a car on iron ore, coal and steel mill scale and $6 a car on pig iron and scrap.

The modified form of the increases from a car to a cents per ton basis was ordered as the result of a petition of the carriers, which asked for such conversion of the charges. Other products to take an increase of 6c. a ton include limestone and fluorspar.

### Meets Requests of Railroads

The commission complied with other requests of the carriers by abandoning its proposals regarding less-than-carload shipments and its pooling plan. The supplemental report provides for a flat increase of 2c. per 100 lb. on all less-than-carload shipments. The commission at first had proposed no increases on less-than-carload shipments of not more than 175 miles, an increase of 1c. per 100 lb. for shipments over 175 miles and not more than 250 miles and 2c. per 100 lb. for more than 250 miles.

The commission also pointed out that objection had been raised to the imposition of the so-called double increase where movements, such as iron ore and coal through Lake and ocean ports, are separated by an intermediate movement over which the commission has no jurisdiction. The commission said the shippers and carriers are left free to work out this situation between themselves.

An additional charge included in the supplemental report covers lighterage.

### Roads to Control Loan Pool

In permitting the carriers to set up a loaning pool, the commission said it did so without either approval or disapproval and would have nothing to do with its operation. The commission added that it relies upon the carriers to apply the funds derived from authorized increases in rates in aid of financially weak railroads as suggested in the original report.

The expectation is that the increased rates will be made effective about Jan. 1. The commission authorized the carriers to file the new rates on short notice.

## Soft Coal Operators Plan to Stabilize Industry

Bituminous coal operators, whose product represents the bulk of the commercial tonnage east of the Mississippi River, at a recent meeting at the Hotel Biltmore, New York, agreed to further a stabilization plan which they declared held out considerable promise for immediate betterment of conditions in the industry.

The plan involves two proposals: first, that steps be taken at once in each of the 21 soft coal districts to form regional or district sales agencies to handle the sale of all coal in each territory, each district's output to be sold at a uniform price fixed by officers of the regional sales committee; second, that proper steps be taken in each of the producing districts for consolidating the physical properties in producing districts along natural and economic lines.

Both proposals received the approval of Col. William J. Donovan, formerly assistant attorney general of the United States, who declared that in his opinion no legal obstacle or insuperable difficulty barred the plan from eventual consummation.

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**Mine Workers' Union to Urge Stabilization Legislation**

WASHINGTON, Dec. 8.—The United Mine Workers of America will urge legislation at the present session of Congress for what it calls stabilization of the coal mining industry. A plan which he has frequently proposed was outlined by President John L. Lewis of the miners' union in testimony he presented last Friday before a subcommittee of the Senate Committee on Manufactures. His testimony was taken in connection with hearings on the bill of Senator La-Follette of Wisconsin to establish a National Economic Council. Mr. Lewis approved the bill.

The plan to stabilize the coal mining industry calls for Federal licensing and regulation of coal operators, encouragement of mergers, selling pools and marketing agencies, to be under the direction of a Federal Coal Commission.

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## Government Steel Price Inquiry Nearing End

WASHINGTON, Dec. 8.—John H. Amen, Department of Justice investigator, is expected to return this week to Washington from Denver prepared to make a report concerning the inquiry into so-called price fixing of steel rails. Announcement to this effect was made last Thursday by Attorney-General Mitchell. The attorney-general was unable to say whether the report of Mr. Amen would be a progress or a final report.

The attorney-general, it is understood, will report to the Interstate Commerce Commission when the investigation is completed and also determine whether the department will institute proceedings.

The inquiry was suggested by the Interstate Commerce Commission after Senator Couzens of Michigan criticized the maintenance of uniform prices of steel rails and their remaining at the same level in the face of falling prices of steel and other products generally.

The Department of Justice also is making an inquiry into the uniformity of prices adopted by the steel industry on plates, shapes and bars.

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## Declares Prices Firmer in America Than Abroad

The likelihood that the United States may be the first nation to recover from the present world depression is seen by the National Foreign Trade Council in the fact that our domestic price levels for the first time in almost two years have acquired comparative stability.

In issuing its annual report on international trade, the council points out that wholesale prices in the United States have remained for five months within about 2 per cent of the index for last June, in contrast with the drop of 11 per cent in the first six months of this year, and in further contrast with the accumulated reduction in average wholesale prices in the United States of more than 25 per cent for the past two years.

The first requisite to world recovery, the council states, is stabilization of prices, and the most favorable aspect of the present situation is the fact that in most other countries their fall is slackening or has already ceased. The general average of prices in the European countries has dropped off this year by less than 10 per cent, or about two-thirds of the rate of reduction experienced in 1930. In Spain, Austria, Chile and the Union of South Africa prices have slightly increased over last year's averages, and a slight upward turn in prices has also begun to equalize the situation in Great Britain and other nations which went off the gold standard in September.

World export prices, however, as distinguished from these domestic wholesale prices, have dropped this year a little more sharply than they did last year, the ruling prices for the chief articles entering into international trade being 15 per cent lower for the first nine months of this year than for the corresponding period of 1930, compared with a drop of about 12 per cent between 1929 and 1930.

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Colorado Fuel & Iron Co., Pueblo, Colo., has called to work a number of its employees in preparation for the reopening in January of the rail mill and several other departments.

## New Company Engages in Welding Equipment Field

The Machinery & Welder Corpn., 2604 North Cicero Avenue, Chicago, has been organized by men long identified with distribution of welding equipment, and will serve as the General Electric Co. distributer of arc welding equipment and accessories in the Chicago territory. The company will maintain a service shop for repairing all types of welding equipment. Its service will include the rental of machines and the sale of new and rebuilt equipment. The company may later enter the resistance welding field.

F. P. Kohlbry, formerly of Halpin-Kohlbry, Inc., St. Louis, welding equipment distributer, heads the company, and with him are associated H. C. Kelsey, formerly in charge of machinery sales in the Buffalo district for Joseph T. Ryerson & Son, Inc.; R. B. Rogers, formerly instructor in arc welding at the General Electric school at Schenectady, N. Y., and J. C. Keene, who will represent the company in railroad sales.

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## Suggests Rustless Shaft for Edison Memorial

A concrete monolith, 840 ft. in height, completely sheathed with rustless steel, was advocated for an Edison memorial by Stanley R. Keith, of the A. P. Smith Mfg. Co., East Orange, N. J., in a recent address to the Manufacturers' Club of Bloomfield, N. J.

Rustless steel is a comparatively new addition to the alloy family, he said, and this generation should not be open to possible future criticism that it had failed to recognize the obvious possibilities of the alloy in the construction of a memorial to so great a member of its own generation.

Indicating the possibilities of such a design, he pointed out that space might be provided at the base of the shaft for mementos and material relating to Thomas A. Edison's life, and at the apex, reached by a spiral stairway, there could be telescope facilities.

Such a memorial, erected on Eagle Rock, in New Jersey, he said, would be visible from the sea as well as from the entire metropolitan area. The monolith could be built in 84 tiers, each 2 ft. smaller in diameter than the one underneath and 10 ft. in height. This would be symbolic of our mathematic system, and the shaft being round, would represent Edison's genius, as the circle may be considered a polygon with an infinite number of sides.

Mr. Keith is metallurgical engineer with the A. P. Smith Mfg. Co., and during the war was in the War Department in charge of metallurgical processes at the Bethlehem Steel Co. in production of ordnance.

# President Recommends Acts to Relieve Economic Depression

## In His Message to Congress He Suggests Reconstruction Corporation and Various Other Emergency Plans

WASHINGTON, Dec. 8.—Economic conditions growing out of the depression and recommendations to relieve them constituted the major points treated by President Hoover in his message to Congress. The necessity of reducing Government expenses also was emphasized.

Recommendations made by the President included, among others, the following:

Further capitalization of Federal land banks so as to stabilize the market values of their bonds.

Enactment of measures to make available quickly to depositors some portion of their deposits in closed banks as the assets of such banks may warrant. Such a provision, it was declared, would go far to relieve distress in a multitude of families, would stabilize values in many communities and would liberate working capital to thousands of concerns.

Legislation to establish a chain of 12 home loan discount banks to relieve present distressing pressure against home and farm property owners. Such a measure, it was declared by the President, would relieve pressure upon and give added strength to building and loan associations, savings banks and deposit banks, engaged in extending such credits.

### Suggests Reconstruction Corporation

Setting up for two years of an emergency Reconstruction Corporation of the nature of the former War Finance Corporation. The Treasury would be authorized to subscribe a reasonable capital to it, and given authority to issue its own debentures. Its purpose was said to be that by strengthening the weak spots to thus liberate the full strength of the nation's resources.

"It should be," the President said, "in position to facilitate exports by American agencies; make advances to agricultural credit agencies where necessary to protect and aid the agricultural industry; to make temporary advances upon proper securities to established industries, railways and financial institutions which cannot otherwise secure credit, and where such advances will protect the credit structure and stimulate employment. Its functions would not overlap those of the National Credit Corporation."

Extension during emergencies of the eligibility provisions in the Federal Reserve act. While the President did not detail the purpose he has previously suggested the necessity of broadening the scope of securities which may be rediscounted at Federal Reserve banks.

Prompt improvement of the banking laws. Congress was urged to investigate the need for separation between different kinds of banking; an enlargement of branch banking under proper restrictions; and the methods by which enlarged membership in the Federal Reserve system may be brought about.

### Recommends Railroad Consolidations

Calling attention to the pressing problems of the railroads and the necessity of their well-maintained and successful operation and of the stability of their finances, the President recommended proper consolidation of the carriers so as to be given opportunity to reduce operating costs. Regulation of competing lines also was urged, and recommendations for their regulation proposed by the Interstate Commerce Commission were commended to Congress by the President.

The necessity of Congressional inquiry into the economic action of the anti-trust laws was again called to the attention of the Congress by the President. He said particular attention should be given to the industries founded upon natural resources, especially where destructive competition produces great wastes of these resources and brings great hardship upon operators, employees and the public. In recent years, the President said, there has been continued demoralization in the bituminous coal, oil and lumber industries.

### Does Not Favor Government Dole

Opposition to any direct or indirect Government dole was expressed by the President in discussing recommendations concerning unemployment. He said that Federal expenditures on public works during the present calendar year will reach about $780,000,000, compared with $260,000,000 in 1928. Through this increased construction, through the maintenance of a full complement of Federal employees, and through services to veterans, the President said, it is estimated that the Federal taxpayer is now directly contributing to the livelihood of 10,000,000 of our citizens.

"We must avoid burdens upon the Government which will create more unemployment in private industry than can be gained by further expansion of employment by the Federal Government," President Hoover said. "We can now stimulate employment and agriculture most effectually and speedily through the voluntary measures in progress, through the thawing out of credit, through the building up of stability abroad, through the home loan discount banks, through an emergency finance corporation and the rehabilitation of the railways and in other such directions."

Recommendation that all building and construction activities of the Government now carried on by many departments be consolidated into an independent establishment under the President to be known as the "Public Works Administration," directed by a Public Works Director.

### Opposed to General Tariff Revision

Opposition expressed to any general Congressional revision of the tariff. Such action, it was stated, would disturb industry, business and agriculture and prolong the depression. The President said that the temporary abandonment of the gold standard by certain countries has also reduced their production costs compared with ours. Fortunately, he added, any increases in the tariffs which may be necessary to protect agriculture and industry from these lowered foreign costs, or decreases in items which may prove to be excessive, may be done under the flexible provisions of the tariff.

The President said the Federal Government must not encroach upon nor permit local communities to abandon local initiative and responsibility. Much of the legislation proposed to Congress and many of the recommendations of the Executive must be designed to meet emergencies, it was declared.

▲ ▲ ▲

# WellmanEngineeringBuys Part of G. H. Williams Co.

The Wellman Engineering Co., Cleveland, has purchased the clamshell bucket and heavy-duty trailer business of the G. H. Williams Co., Erie, Pa., and will at once transfer the engineering, manufacture and sale of these products to its plant in Cleveland. The Williams company has been in business for about 30 years, being one of the oldest builders of the clamshell type of material handling buckets and the originator of the power-arm type. The line covers a complete range from light buckets for fast rehandling to the largest types. The trailers, built in various capacities, are for use in transporting contractor's and other types of heavy equipment.

W. C. Swalley, secretary and general manager; A. J. Lichtinger, assistant manager; C. F. Weiblen, sales manager, and P. T. Robin, chief engineer of the G. H. Williams Co., will become associated with the Wellman company at Cleveland in the manufacture and sale of the Williams line of equipment.

# Exports Lowest in Nearly 27 Years; Imports Down Also

WASHINGTON, Dec. 1.—Continuing their downward trend, exports of iron and steel from the United States in October dropped to the low mark of only 59,335 gross tons. This is the smallest monthly movement of outbound shipments since January, 1905, when they were 56,810 tons. The decline from September was 10,433 tons.

In the first 10 months of the current year exports were only 848,449 tons, indicating that for the entire year they may not reach 1,000,000 tons. In the first 10 months of last year exports were 1,768,014 tons.

Imports in October totaled 29,401 tons, a decline of 1565 tons from September. In the first 10 months of 1931 they were 359,790 tons, compared with 453,639 tons in the corresponding period of 1930. Except for February, the October imports were the lowest for any month since January, 1924.

The largest single export movement in October was in scrap, of which 10,801 tons went to Japan, 1043 tons to Canada and 925 tons to China. The heaviest movement in the finished lines was in black steel sheets, of which Canada took 2280 tons. Of the plain structural material exported, Canada took 3269 tons. Total shipments to Canada were 16,522 tons. Japan ranked almost as high, taking 15,137 tons.

Of the imports, the heaviest movement was in structural shapes, 6416 tons—larger than any finished tonnage exported. Belgium supplied 3420 tons of the incoming shipments of shapes. The next largest movement in imports was in merchant steel bars, of which Belgium supplied 3759 tons. That country also was the source of 2773 tons of the reinforcement concrete bars imported and of 1376 tons of the hoops and bands. Imports of plain material from France totaled 2029 tons, while 999 tons of hoops and bands came from that country.

Imports of ferromanganese included 672 tons from Canada and 118 tons from Germany. Imports of manganese ore amounted to 21,532 tons. Soviet Russia supplied 8980 tons; Brazil, 7463 tons; India, 2600 tons; Gold Coast of Africa, 2335 tons.

Belgium supplied 12,608 tons, or 42.8 per cent, of the total October imports. Imports from Germany were 4996 tons; from France, 4304 tons.

Finished rolled steel exported was the lowest since January, 1905, but finished rolled steel imported was the highest (except for July) since last April. Semi-finished exports were the lowest, with one exception, in about two years and semi-finished imports the lowest since July, 1925.

**Exports of Iron and Steel from the United States**

(In Gross Tons)

| | October | | 10 Months Ended October | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Pig iron | 456 | 1,419 | 5,596 | 12,632 |
| Ferromanganese | 8 | ..... | 1,251 | 6,138 |
| Scrap | 13,512 | 12,611 | 123,769 | 339,167 |
| *Pig iron, ferroalloys and scrap* | *13,976* | *14,030* | *130,616* | *357,937* |
| Ingots, blooms, billets, sheet bar | 113 | 579 | 3,574 | 15,547 |
| Skelp | 4,089 | 20,061 | 52,030 | 105,811 |
| Wire rods | 1,621 | 1,637 | 28,559 | 34,221 |
| *Semi-finished steel* | *5,824* | *22,277* | *84,163* | *155,579* |
| Steel bars | 3,653 | 5,263 | 34,318 | 74,808 |
| Alloy steel bars | 125 | 286 | 2,744 | 5,989 |
| Iron bars | 35 | 92 | 958 | 1,604 |
| Plates, iron and steel | 1,845 | 4,954 | 39,849 | 87,200 |
| Sheets, galvanized steel | 3,242 | 6,122 | 42,726 | 76,153 |
| Sheets, galvanized iron | 216 | 473 | 3,901 | 5,698 |
| Sheets, black steel | 4,687 | 15,494 | 75,630 | 107,179 |
| Sheets, black iron | 196 | 908 | 4,935 | 9,800 |
| Hoops, bands, strip steel | 1,891 | 1,916 | 25,342 | 35,367 |
| Tin plate; terne plate | 6,138 | 13,569 | 72,201 | 194,275 |
| Structural shapes, plain material | 3,605 | 10,801 | 82,236 | 124,321 |
| Structural material, fabricated | 479 | 8,125 | 27,247 | 90,595 |
| Tanks, steel | 512 | 1,759 | 10,876 | 15,460 |
| Steel rails | 888 | 1,546 | 27,067 | 89,342 |
| Rail fastenings, switches, frogs, etc. | 377 | 1,032 | 6,467 | 16,876 |
| Boiler tubes | 542 | 837 | 6,390 | 13,020 |
| Casing and oil-line pipe | 467 | 2,295 | 20,213 | 55,411 |
| Pipe, black and galvanized, welded steel | 4,064 | 4,390 | 45,980 | 70,553 |
| Pipe, black and galvanized, welded iron | 189 | 703 | 4,757 | 13,292 |
| Plain wire | 1,221 | 2,227 | 11,920 | 22,799 |
| Barbed wire and woven wire fencing | 1,134 | 2,901 | 21,131 | 34,798 |
| Wire cloth and screening | 54 | 73 | 1,130 | 1,418 |
| Wire rope | 189 | 266 | 2,245 | 4,039 |
| Wire nails | 934 | 733 | 7,059 | 7,079 |
| Other nails and tacks | 287 | 447 | 3,247 | 5,132 |
| Horseshoes | 13 | 24 | 140 | 160 |
| Bolts, nuts, rivets and washers, except track | 328 | 645 | 4,311 | 8,905 |
| *Rolled and finished steel* | *37,251* | *88,882* | *585,000* | *1,171,283* |
| Cast iron pipe and fittings | 537 | 2,248 | 19,473 | 27,629 |
| Malleable iron screwed fittings | 241 | 669 | 4,633 | 9,024 |
| Car wheels and axles | 264 | 1,445 | 5,592 | 13,028 |
| Iron castings | 271 | 228 | 3,763 | 5,633 |
| Steel castings | 157 | 498 | 2,985 | 8,601 |
| Forgings | 336 | 520 | 6,446 | 7,326 |
| *Castings and forgings* | *1,809* | *5,608* | *42,292* | *71,251* |
| All other | 476 | 1,048 | 6,378 | 11,964 |
| Total | 59,335 | 131,845 | 848,449 | 1,768,014 |

**Imports of Iron and Steel Products into the United States**

(In Gross Tons)

| | October | | 10 Months Ended October | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Pig iron | 4,413 | 13,552 | 74,610 | 104,945 |
| Sponge iron | ..... | 10 | 210 | |
| Ferromanganese and spiegeleisen* | 873 | 2,247 | 21,222 | 47,619 |
| Ferrochrome† | ..... | ..... | 96 | 162 |
| Ferrosilicon‡ | 23 | 74 | 643 | 4,331 |
| Other ferroalloys | 25 | 25 | 1,575 | 310 |
| Scrap | 1,041 | 4,336 | 15,009 | 24,879 |
| *Pig iron, ferroalloys and scrap* | *6,375* | *20,244* | *113,356* | *182,241* |
| Steel ingots, blooms, billets, etc. | 750 | 2,264 | 15,760 | 18,227 |
| Wire rods | 250 | 496 | 5,828 | 7,576 |
| *Semi-finished steel* | *1,000* | *2,760* | *21,588* | *25,803* |
| Concrete reinforcem't bars | 3,411 | 541 | 35,201 | 36,506 |
| Hollow bar and drill steel | 117 | 139 | 1,394 | |
| Merchant steel bars | 5,344 | 1,713 | 42,550 | |
| Iron bars | 18 | 109 | 740 | 1,098 |
| Iron slabs | ..... | ..... | 40 | |
| Boiler and other plate | 2 | ..... | 731 | 1,792 |
| Sheets, skelp and saw plate | 440 | 2,083 | 15,644 | 22,801 |
| Tin plate | 2 | 23 | 149 | 230 |
| Structural shapes | 6,416 | 4,615 | 62,059 | 110,939 |
| Sheet piling | 338 | 266 | 919 | |
| Rails and rail fastenings | 198 | 391 | 4,642 | 7,666 |
| Welded pipe | 290 | 252 | 6,266 | 5,199 |
| Other pipe | 445 | 822 | 6,752 | 12,516 |
| Barbed wire | 513 | 428 | 6,867 | 4,018 |
| Round iron and steel wire | 140 | 158 | 2,233 | 3,903 |
| Flat wire and strip steel | 64 | 47 | 586 | 1,020 |
| Wire rope and strand | 197 | 196 | 1,631 | 2,218 |
| Other wire | 42 | 32 | 482 | 332 |
| Hoops and bands | 3,106 | 2,444 | 19,368 | 19,693 |
| Nails, tacks and staples | 604 | 578 | 7,449 | 4,823 |
| Bolts, nuts and rivets | 67 | 13 | 823 | 304 |
| Other finished steel | 14 | 16 | 233 | 59 |
| *Rolled and finished steel* | *21,768* | *14,866* | *216,759* | *235,117* |
| Cast iron pipe and fittings | 125 | 364 | 6,476 | 9,144 |
| Castings and forgings | 133 | 110 | 1,611 | 1,334 |
| Total | 29,401 | 38,344 | 359,790 | 453,639 |
| Manganese ore* | 21,532 | 18,538 | 228,736 | 242,209 |
| Iron ore | 70,022 | 186,396 | 1,281,736 | 2,584,403 |
| Magnesite (dead burned) | 202 | 622 | 34,276 | 34,696 |

*Manganese content only.
†Chromium content only.
‡Silicon content only.

# OFF THE ASSEMBLY LINE

# Ford Expects to Make 120,000 Cars in December and January

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DETROIT, Dec. 7.

AFTER months of relative inactivity, the Ford Motor Co. at last is showing tangible signs of an awakening. Certain parts makers have been given shipping releases on orders placed some time ago, indicating that Ford has as its goal the production of 20,000 to 25,000 cars this month and 100,000 in January. The Murray Corpn. put the first trial lot of Ford frames through its new Ecorse plant the past week and as soon as operations are running smoothly will schedule this work on a production basis. Kelsey-Hayes Wheel Corpn. has expanded its output of wheels as the result of Ford shipping releases. Some suppliers are still standing by, awaiting word from Ford before beginning the manufacture of parts, but are expected to get the signal to go ahead this week.

The Ford company itself has made commitments for cold-rolled strip steel in the last few days, some of it for delivery this month and the rest for first quarter. This transaction by no means covers its entire requirements for the first three months of next year, as the bulk of its cold-rolled strip business has not yet been allocated. The orders which have been placed are subject to later shipping releases, but are sufficiently definite that mills can schedule rollings ahead if they think this procedure advisable.

Ford's major steel contracts for the first quarter have not been awarded, the purchasing division on two occasions having announced postponement of a decision. The steel trade, meanwhile, is waiting nervously from day to day to find out what mills will get this tonnage.

In circles close to the Ford company some doubt is expressed whether 25,000 cars can be made during December. Much work remains to be done before the production machinery is running smoothly at Rouge and great effort is being exerted to attain the desired goal. However, it will not be surprising if output falls short of expectations in view of the difficulties yet to be overcome. There apparently is no intention on the part of the Ford company of resuming operations at its steel plant in the immediate future; it still has a sizable stock of steel in its yards which will be used in large part before its rolling mills get into action again. Murray and Briggs have not yet begun to turn out Ford bodies. Announcement of the new Ford probably will be made shortly after the first of the year.

**Ford has tentative production program of 20,000 cars in December and 100,000 in January.**

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**Ford has given shipping releases to some parts suppliers and has placed orders for cold-rolled strip steel.**

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**Chevrolet will make 37,000 cars this month, with a larger volume scheduled for January.**

* * *

**November output estimated at 65,562 units. December may not be over 100,000 units. Entire year's assemblies will be about 2,450,000 cars.**

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### New Chevrolet Attracts Attention

Displayed for the first time last Saturday, the new Chevrolet attracted wide attention. The synchromesh transmission, with which is combined an over-running clutch, is the outstanding feature. The latter consists of only three major operating parts. Down-draft carburetion is now used with a counterbalanced crankshaft. Louvres have been replaced by doors on the hood; on the de luxe models these doors are chromium plated. Crankshaft main bearings have been improved by the adoption of thinner walls, thus permitting an increase in the diameter of the crankshaft journals. The entire forward end of the frame has been redesigned to give structural strength. On all 1932 models the tire section is larger and the wheels smaller in diameter. The radiator curves inward at the bottom to give the effect of setting down between the fenders. The chromium plated grille is an integral part of the radiator. It has square meshes stamped in relief with the vertical lines accentuated to increase the appearance of height. The entire radiator shell is chromium plated. There are 12 models priced at the same level as the past year.

During the first 10 months of 1931, Chevrolet registered 534,702 passenger cars, a decline of only 5 per cent from the preceding year. Despite the reduced volume, its dealers will show profits of $12,000,000 in excess of 1930. Chevrolet dealers have only 25,000 cars of the old series on hand, or an average of 2½ cars per dealer; this demonstrates how closely production has been attuned to sales demand. December output will be 37,000 cars, with a somewhat larger volume scheduled for January. The company does not contemplate building up stocks for spring sales until March.

Chevrolet is now employing 34,000 men an average of four days a week.

### Chrysler Ships 90,706 Cars

In the first 11 months of this year, Chrysler Sales Corpn. shipped 90,706 cars to dealers, compared with 81,957 in the same period last year, a gain of 10.7 per cent. Shipments of Chrysler sixes totaled 33,467 cars,

against 25,059 in 1930. Dodge has started turning out its 1932 models at a slow pace, but no public announcement will be made until the January shows. Cars bearing the Chrysler name are not yet ready for the production line. Reo will offer as a major improvement an automatic clutch control, differing somewhat in operation from Buick's, but designed to achieve the same purpose; that is, ease of shifting gears and running the car. Embodied in this construction is free wheeling. Aside from this change, the Reo will be much the same as during the past year.

### Studebaker's New Models

Studebaker is presenting for 1932 a new free wheeling unit, which includes free wheeling in all forward speeds plus synchronized shifting. The unit is located behind the gear box instead of inside it as before. It is in the form of an over-running clutch. Constant mesh helical gears in high and second speeds produce quietness. Gears may be shifted in all forward speeds without touching the clutch, which is employed only in starting and stopping. Free wheeling is locked out by means of a hand lever which protrudes from beneath the dash.

In addition to the improvement in transmission, Studebaker will offer longer wheelbases on all models, bodies with slanting windshield and visorless peak panel and a radiator of wedge shaped appearance. All models will have safety glass as standard equipment in the windshield and in all windows, the first time that this feature has been offered at no extra cost in the medium price field. The frame is of double drop construction, with lower center of gravity obtained by lower body mounting and wider tread.

All cars are equipped with automatic starters and an automatic ride control, which is made possible by the use of a new type of shock absorber. The absorbers are thermostatically controlled to adjust themselves automatically for riding comfort at each variation of temperature and mechanically controlled to compensate automatically for variations of speed or road surface. Rubber mountings at the four points of motor suspension, referred to as cushioned power, prevent vibration being transmitted to the chassis.

A new and interesting engine refinement is vacuum spark control. This consists of a small vacuum cup mounted adjacent to the distributor, which automatically retards the spark about six degrees during acceleration with wide open throttle. When the need for the retarded spark is over, the device returns the spark to its normal position. Although the President and Commander eights have aluminum alloy pistons, the Dictator eight and Studebaker six are equipped with a newly developed plated cast iron piston, which permits a closer fitting, freer acting, self lubricating piston surface, thereby reducing scoring and preventing piston slap.

The 22 new models on four wheelbases, ranging from 117 to 135 in., are priced at $840 to $1,890. Eight of the models are of the convertible body type.

Buick manufactured 9053 cars in November, compared with 5012 in October and 7177 in November, 1930. Lincoln is presenting eight standard body types and 16 custom types in its new 12-cylinder car. Bodies are distinguished by sweeping air-flow lines. The V-shaped radiator and lamps as well as the slanting windshield accentuate the streamlining effect.

So far as 1932 models are concerned, driving will be made easier not only in gear shifting and braking, but also in proper mixture control, heat regulation and spark advance, which will be taken care of automatically. One manufacturer has gone so far as to make it impossible to drive with the choke closed. It seems that the choke is thrown out of operation automatically as soon as the engine picks up.

### November Sets New Low Mark

Automobile men will have to search through the industry's records a long time to find a month when production was as low as in November. The National Automobile Chamber of Commerce estimates output at 65,562 units, a decrease of 20 per cent from October and 54 per cent from November, 1930. The industry's assemblies for 11 months were placed at 2,343,834 units. It now looks as though December production will not be much more than 100,000 cars. This means that the year's total will be about 2,450,000 cars, compared with 3,500,000 in 1930. Just how low operations have sunk in the fourth quarter is best realized by pointing out that total assemblies in October, November and December will not exceed 250,000 cars, compared with 352,867 cars in the peak month of April.

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Electric Auto Lite Co. has been awarded the contract for the starting, lighting and ignition equipment for the new Rockne six.

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Chrysler Corpn. is not expected to place its first quarter steel contracts until the middle of December. Fisher Body Corpn. will issue an inquiry for steel shortly for its plant at Cleveland making Chevrolet bodies.

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Cash holdings of General Motors Corpn, increased $85,000,000 during the first nine months of 1931.

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Ford commercial car registrations in the first 10 months of this year were about 128,000, against 91,000 for Chevrolet. Dodge commercial sales were 12,000 cars. International 19,000, General Motors Truck 5800, Reo 4450, Willys 2555, Diamond T 2200, Studebaker 3150 and White 2275.

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Buick's accumulated orders at the end of November were for more than 16,000 cars, the best showing for that month in the company's history.

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## Pig Iron Imports Drop Again

Imports of pig iron into the United States in October are reported by the Department of Commerce at 4413 gross tons, compared with 5104 tons in September. Except for last August and last February, this is the smallest total for any month since March, 1922. It is less than one-third of the 13,552 tons imported in October, 1930.

In the 10 months, imports have been 74,610 tons, or about 28 per cent below the 103,939 tons in 10 months of 1930. This is the smallest total for 10 months since 1921.

As has been the case for some time, British India led as the source of supply, with about 77 per cent of the total, compared with 69 per cent a year earlier. In the 10 months, India's proportion was about 79 per cent, against about 75 per cent in the 10 months of 1930.

In the longer period Netherlands was in second position this year, but trailed far behind Great Britain a year ago. Sweden, in third place this year, ahead of Britain, was fourth in 1930.

**United States Imports of Pig Iron by Countries of Shipment**
(In Gross Tons)

| | October | | Ten Months Ended October | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| United Kingdon | 300 | 3,407 | 2,606 | 12,146 |
| British India | 3,396 | 9,256 | 58,790 | 77,601 |
| Germany | 150 | .... | 202 | 50 |
| Netherlands | 211 | 100 | 6,569 | 6,041 |
| Canada | 103 | 74 | 1,334 | 562 |
| France | .... | .... | 25 | .... |
| Belgium | .... | .... | 300 | 615 |
| Norway | 51 | .... | 225 | 2,834 |
| Sweden | .... | 685 | 3,401 | 3,292 |
| All others | 202 | 30 | 1,158 | 798 |
| Total | 4,413 | 13,552 | 74,610 | 103,939 |

# ... PERSONALS ...

W. S. HOVEY has resigned as president and general manager of Fairbanks, Morse & Co., Chicago. COL. ROBERT H. MORSE, formerly vice-chairman of the board, has been elected to succeed Mr. Hovey in both positions.

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H. E. JOY has been appointed steel buyer for the Chrysler Corpn., Detroit, succeeding A. MULLEN. He has been associated with Dodge Brothers, Inc., for a number of years and recently has had supervision of the material planning department.

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FRED W. BUSCHE has resigned as works manager, Allen-Hough Carryola Co., Milwaukee, manufacturer of portable phonographs and radio specialties, to become associated with Iroquois Foundry Co., Racine, Wis., as vice-president in charge of a new brass and aluminum casting division now being established. Mr. Busche formerly was vice-president, Prime Mfg. Co., Milwaukee, in direct charge of foundry division.

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PAUL R. CLARK, who has been identified with the expanded metal and fireproof materials business for 20 years, has been appointed manager of the New York office, at 103 Park Avenue, of the Consolidated Expanded Metal Companies, Wheeling, W. Va. He succeeds GEORGE BARNES, who has resigned.

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J. E. DUNCAN, who for the past several years sold sheet steel in the Detroit district, has become affiliated with the sales department of the Marks Perry Steel Corpn., Detroit.

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B. F. SHEPHERD, chief metallurgist, Ingersoll-Rand Co., Phillipsburg, N. J., sailed for Sweden on Dec. 2.

W. A. FORBES, assistant to the president, United States Steel Corpn., New York, is scheduled to speak on "Present Day Economic Survey of Bituminous Coal" on Dec. 10 at the monthly dinner meeting of the New York section of the American Institute of Mining and Metallurgical Engineers.

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P. HUNTER has been appointed purchasing agent by the Chicago, Burlington & Quincy Railroad, to succeed the late E. F. Hasbrook. Mr. Hunter has served the Burlington for 27 years.

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GEORGE E. J. PISTOR, for many years treasurer of the American Institute of Steel Construction, New York, spoke on the "Erection of Structural Steel" before the School of Civil Engineering of Cornell University, Dec. 7.

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JOHN N. WILLYS, United States Ambassador to Poland and formerly president and chairman of the board of the Willys-Overland Co., is to be the speaker at the annual dinner of the Society of Automotive Engineers, to be held at the Pennsylvania Hotel, New York, Jan. 14.

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DR. WALTER S. LANDIS, vice-president, American Cyanamid Co., has been elected chairman of the New York section of the American Chemical Society for 1932. He succeeds PROF. ARTHUR E. HILL, of New York University.

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## Charles L. Allen Honored by Norton Co. Associates

Charles L. Allen, president and general manager of the Norton Co., Worcester, Mass., was guest of honor at dinner at the Worcester Club, Dec. 4, in commemoration of his completion of 50 yeas of leadership in the abrasive industry. He has been general manager during all of the 45 years that have elapsed since the organization in 1885 of the Norton Emery Wheel Co., as the Norton Co. was first known. The occasion was given international significance by an honor bestowed upon Mr. Allen by King Gustaf V of Sweden, who, through Olof H. Lamm of New York, Sweden's consul general in the United States, made him a Knight of the First Class of the Order of Vasa, in recognition of his contribution to the development of friendly relations between the United States and Sweden. The honor has come to few American citizens not of Swedish descent. Congratulations were received from President Hoover and ex-president Calvin Coolidge. There were present 80 officials of the company, including managers of branch offices.

When Mr. Allen entered the business as a very young man, half a century ago, the grinding wheel was something of no importance, used only here and there in toolrooms. It was unknown as a manufacturing tool. Frank B. Norton conducted a pottery in an ancient building in Worcester, and there, in 1873, the first emery wheel was made by vitrifying process. Wheels were first manufactured commercially at the pottery in 1879. Mr. Allen became connected with the business in 1881. He was one of a little group of men who conceived the idea that the abrasive wheel was destined to be a very important factor in manufacturing industry. The others were Milton P. Higgin and George I. Alden, professors at the Worcester Polytechnic Institute, John Jeppson, expert in ceramics, and W. L. Messer. The outcome of their theory was the formation of the Norton Emery Wheel Co., which was incorporated in 1885, began manufacturing in the pottery, and the next year moved into a modest little building at Barbers Crossing, which was the nucleus of the present great Norton plant. Besides the group of men mentioned, the incorporators were Fred H. Daniels, who later was a director and the chief engineer of the Norton Co., and Horace A. Young, who was superintendent of the Washburn & Moen Mfg. Co. Mr. Allen is the only survivor of these men.

Aldus C. Higgins, treasurer of the Norton Co., was the toastmaster, and the speakers were William La Coste Neilson, vice-president in charge of sales; Hugo W. H. Beth, works manager of the grinding wheel division; Howard W. Dunbar, works manager of the grinding machine division, and Lewis E. Saunders, manager of research and abrasive parts.

Mr. Allen was presented with a silver tray and inkwell, designed and executed by a famous silversmith, the address being made by George N. Jeppson, secretary of the company and vice-president in charge of production.

H. S. VANCE

HAROLD S. VANCE, who, as announced in these columns last week, has been made president of the Rockne Motors Corpn., Detroit.

R. A. VAIL, formerly vice-president of Durant Motor Co., has been appointed vice-president in charge of engineering and manufacture of the Rockne company.

R. A. VAIL

# ...OBITUARY...

CLARENCE H. HOWARD, president of the Commonwealth Steel Co., Granite City, Ill., until it was sold in April, 1929, to the General Steel Castings Corpn., died of heart disease, Dec. 6, in the Christian Science Benevolent Association Sanitorium in Boston. He

C. H. HOWARD

was a strong exponent of the golden rule system in industry and fathered many profit-sharing projects for his employees. And at various times he donated large sums of money to the Boy Scout movement.

Mr. Howard was born in Centralia, Ill., Feb. 22, 1863, the son of a master mechanic for the Union Pacific Railroad, and he was reared in Grand Island, Neb. At 14, he left his home to go to work in the Union Pacific shops at North Platte, Neb. He received his technical training at Washington University, St. Louis. In 1899 he became vice-president of the Shickle, Harrison & Howard Steel Co., later Leighton & Howard Steel Co. The latter was absorbed in 1902 by the American Foundries Co., and in 1904 Mr. Howard obtained a controlling interest in the Commonwealth Steel Co. He was made chairman of the board of the General Steel Castings Corpn., when it took over the Commonwealth company, and resigned that position in April, 1930.

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ROBERT I. CLEGG, at one time New England editorial representative of THE IRON AGE and a widely-known writer in the business and technical paper publishing field, died at his home in Cleveland Dec. 3, aged 65 years. He was formerly associate editor of *Iron Trade Review* and *Foundry* and later editor of *Woodcraft*, a magazine published in Cleveland several years ago. In recent years he had been engaged writing history for the Masonic fraternity, his work requiring residence in part in England and some wide traveling. At the time of his death he was vice-president of the Gardner Printing Co., Cleveland. He was a member of the national societies of mechanical and civil engineering and had served as a member of the Cleveland Board of Education.

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E. R. GRIFFITH, for 25 years traffic manager of the Sharon Steel Hoop Co., Sharon, Pa., died suddenly in Akron on Dec. 1, aged 49 years. He was identified with the Pennsylvania and Erie railroads before joining the Sharon company, from which he had resigned early this year.

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GEORGE S. CROSBY, retired manufacturer of malleable iron toys, died at his home in Simonsville, Vt., on Dec. 6, aged 85 years.

WALTER W. CHENEY, JR., vice-president of S. Cheney & Son, Manlius, N. Y., died of pneumonia on Nov. 28, aged 43 years. He had been a director and superintendent of the company for many years. Mr. Cheney was a graduate of the Sheffield Scientific School of Yale University and was a member of the National Founders' Association and American Foundrymen's Association.

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FRANK MOORE, for many years identified with the Westinghouse Air Brake Co., Wilmerding, Pa., and widely known as an inventor and engineer, died on Dec. 6 at his home in Pittsburgh. He was born at Central Bridge, N. Y., in 1859 and had been identified with the Westinghouse company for 40 years. In his early days he was associated with the late George Westinghouse, having aided the latter in the development of the equalizing valve in the Westinghouse air brake. Mr. Moore organized the Pittsburgh Malleable Iron Co., Pittsburgh, and the Zanesville Malleable Iron Co., Zanesville, Ohio, and at the time of his death was president of the Pittsburgh Machine Tool Co.

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## Valley Mills to Work for River Canalization

Under the leadership of Frank Purnell, president, Youngstown Sheet & Tube Co.; T. J. Bray, who was once president of the former Republic Iron & Steel Co.; H. S. Warwick, special industrial representative of the Sheet & Tube company, and others, the Youngstown district plans to make an aggressive fight in 1932 for the proposed canalization of the Mahoning, Beaver and Shenango Rivers. Creation of the proposed waterway, it is contended by some steel company leaders, is essential to the continued growth and prosperity of the steel industry in the Valleys. In recent years, states Mr. Purnell, the advantages of districts having cheaper water transportation facilities has been especially emphasized because of keen competitive conditions existing in the steel trade.

To offset this condition, the Sheet & Tube company has taken the lead in the movement to create the proposed waterway, which would effect substantial savings not only in the transportation of bulky inbound materials required in iron and steel manufacture, such as coal, iron ore, limestone, dolomite and steel scrap, but would cut carrying charges on outbound shipments.

As a measure of temporary relief, steel companies in the Youngstown district are now considering a plan and studying costs relating to the hauling of fluxstone from the Carbon, Bessemer and Hillsville quarries in western Pennsylvania to the blast furnaces, by motor truck instead of rail. This is the first intensive study of the kind which the industry has made and is precipitated by the recent decision of the Interstate Commerce Commission permitting the imposition of an extra $3 per car charge.

Through the intensive campaign waged the past two years, the three Valleys affected are rapidly becoming "canal-minded," and the issue will be carried to Congress. The engineering feasibility of the proposed Lake Erie-Ohio River canal is now being considered by a board of United States Army engineers, which is expected to report favorably and make recommendations with respect to a specific routing.

The advantage of Pittsburgh steel makers in being able to make shipments of finished materials to the South and Southwest via the Ohio and Mississippi Rivers has been especially demonstrated, particularly in steel pipe. However, one of the principal advantages arising from water haul advantages is in the lower cost of assembling raw materials, chiefly coal.

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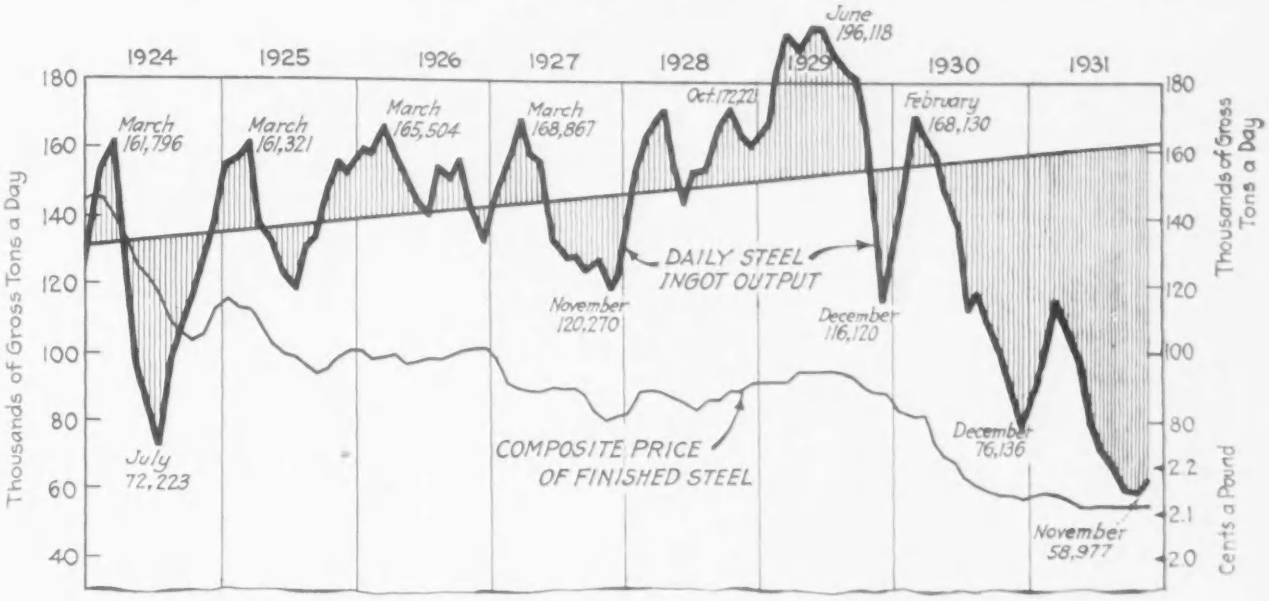
## European Car Builders Meet British Competition

BERLIN, GERMANY, Nov. 28.—A meeting for renewal of the Continental Railway Car Cartel will be held in Paris in December. Keen competition for export business is being encountered from British car builders, and prices are about 15 per cent lower than a year ago on passenger coaches, 18 to 20 per cent lower on freight cars and 8 to 10 per cent lower on special refrigerating and tank cars.

Ingot output in November showed a reversal of the decline, with a gain of 8 per cent in the daily rate. Prices averaged the same as in August, September and October.




# Upward Turn in Steel Ingot Production

PRODUCTION of steel ingots in the United States in November is reported by the American Iron and Steel Institute at 1,593,684 gross tons. This is slightly greater than the October figure.

On the daily basis, with 25 working days, the average daily output in November was 63,747 tons, a gain of almost 5000 tons daily on the 27 days of October. The November daily average is the highest since that for August. On the capacity side, output in November was 30.01 per cent, compared with 27.76 per cent in October and 28.02 per cent in September.

Considering September and October as about equivalent, which indeed they were, this makes the first real upturn since last March. At that time production was almost double the present, with a monthly total of practically 3,000,000 tons, and represented 115,139 tons daily, the highest figure since that of August, 1930.

### Spurt in Bessemer Ingots

Despite the slight increase in total output in November compared with October, there was a decline in open-hearth ingots of more than 3 per cent, but this was overbalanced by an increase of above 22 per cent in production of Bessemer ingots, which made the largest total since that of last June. In place of Bessemer ingots being only 13 per cent of the total output, as in October, they represented almost 16 per cent in November.

Production in 11 months is calculated at 23,597,796 gross tons, an average of 82,799 tons a day, and representing practically 39 per cent of capacity. This compares with 37,306,739 tons in the first 11 months of 1930, which was more than 65 per cent of capacity, with the same number of working days. In the 10-month period open-hearth output fell off about 39 per cent and Bessemer output in approximately the same proportion.

Electric and crucible ingots are not included in these figures. In 1930 they constituted 0.8 per cent of the ingot output.

If November proves to have been indeed a real turning point, then production for the year will be something over 25,000,000 tons and probably less than 25,500,000 tons. This compares with 39,286,287 tons in 1930, and the drop will be about 36 per cent.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

| | Reported by Companies Which Made 95.21 Per Cent of the 1930 Ingots | | Calculated Output of All Companies | | No. of Working Days |
|---|---|---|---|---|---|
| | Open-Hearth | Bessemer | Monthly | Daily | |
| Total, 1929 | 44,101,321 | 7,091,680 | 54,312,279 | 174,639 | 311 |
| 1930 | | | | | |
| January | 3,157,761 | 441,572 | 3,778,235 | 139,935 | 27 |
| February | 3,333,428 | 508,618 | 4,035,111 | 168,130 | 24 |
| March | 3,513,269 | 539,616 | 4,254,331 | 163,628 | 26 |
| April | 3,405,671 | 509,234 | 4,109,492 | 158,057 | 26 |
| May | 3,265,353 | 528,968 | 3,982,915 | 147,515 | 27 |
| June | 2,849,079 | 407,586 | 3,418,535 | 136,739 | 25 |
| Six months | 19,526,561 | 2,935,594 | 23,578,619 | 152,120 | 155 |
| July | 2,436,128 | 353,722 | 2,922,220 | 112,393 | 26 |
| August | 2,541,367 | 374,467 | 3,060,763 | 117,722 | 26 |
| September | 2,275,910 | 429,975 | 2,840,379 | 109,245 | 26 |
| October | 2,185,341 | 399,704 | 2,692,539 | 99,724 | 27 |
| November | 1,807,133 | 300,339 | 2,212,220 | 88,489 | 25 |
| Eleven months | 30,746,439 | 4,793,802 | 37,306,739 | 130,901 | 285 |
| December | 1,659,027 | 226,786 | 1,979,548 | 76,136 | 26 |
| Total, 1930 | 32,405,466 | 5,020,588 | 39,286,287 | 126,322 | 311 |
| 1931 | | | | | |
| January | 2,044,298 | 296,620 | 2,458,689 | 91,063 | 27 |
| February | 2,085,528 | 296,972 | 2,502,366 | 104,265 | 24 |
| March | 2,564,666 | 346,139 | 2,993,590 | 115,139 | 26 |
| April | 2,275,404 | 316,668 | 2,722,479 | 104,711 | 26 |
| May | 2,083,833 | 301,639 | 2,505,485 | 96,365 | 26 |
| June | 1,730,169 | 246,365 | 2,075,910 | 79,843 | 26 |
| Six months | 12,723,233 | 1,804,403 | 15,258,519 | 98,442 | 155 |
| July | 1,570,776 | 225,630 | 1,886,153 | 72,544 | 26 |
| August | 1,462,720 | 174,380 | 1,719,462 | 66,133 | 26 |
| September | 1,274,321 | 199,151 | 1,547,602 | 59,523 | 26 |
| October | 1,320,158 | 195,942 | 1,592,376 | 58,971 | 27 |
| November | 1,276,906 | 240,441 | 1,593,684 | 63,747 | 25 |
| Eleven months | 19,628,114 | 2,839,348 | 23,597,796 | 82,799 | 285 |

W. W. MACON
*Editor*

# ..THE IRON AGE..

A. I. FINDLEY
*Editor Emeritus*

(ESTABLISHED 1855)

## The Prolongation of Readjustment

REGRET has become widespread that we have taken two years for readjustment and do not seem to have completed the job even now. Allowance must be made for the emotional side, as one naturally wishes his troubles were in the past, but in sober judgment many men now feel that serious mistakes or blunders were made. The effort of two years ago was avowedly an effort to "bridge the gap" when there was no side visible to which to extend the bridge. Palliatives were applied which acted to postpone rather than to readjust.

The feeling is that we were attempting to apply "modern methods" to a situation when, of course, no new rule had been established. The "new era" itself had been supposed to be modern but afterward it came in for much criticism. From one angle indeed it looks as if we have made two mistakes of the same general character, only in opposite directions.

The case of the railroads is in point. It is just six months now since the railroads presented their plea to the Interstate Commerce Commission for a 15 per cent advance in freight rates, to save themselves. Apparently it was the belief of the railroads that the remedy if applied would be a success, and for a short time the public held that view. It was not long until public opinion changed as to the wisdom of the advance. The matter was referred to in this department of THE IRON AGE of Sept. 3, under the caption "Railroads should take their place" in the troubles that business and finance at large were experiencing. The railroads are now seen to be in for a hard time, with receiverships beginning to appear.

It is not a case of the general situation having grown materially worse. Things have merely been working out and it seems a pity now that railroad shares and bonds are behaving as they are, for an unfavorable influence is exerted on the general situation. These declines are now to an extent a cause of poor business, whereas they should only be a result. It is regrettable that the result did not come sooner, at what hindsight now indicates would have been the right time, whereupon there would not have been these fresh worries coming along in the last few weeks.

A very unfortunate thing is that this prolongation of readjustment tends to make the depression seem worse than it is. Earlier in the period the statisticians dug up the records of past depressions, referring to average and maximum lengths in the past, chiefly as an argument that the depression could not last much longer. Well, it has, and so people may be influenced to appraise it as all the worse because it has lasted so particularly long. It may be that the patient has been kept in bed longer than would have been the case if nature had been allowed more scope. The badness of this depression should not be appraised by reference to its length. Historians of the future may judge that the job could have been done more quickly.

## The Position of Labor

ADJUSTMENT of rates for labor in this country is now nearly complete. The unions of building mechanics have surrendered almost everywhere. The only redoubts still standing are in a few of the big cities, like Boston and New York, and they are about to fall. Indeed, the Boston carpenters have already surrendered. In the New York area there is extensive cutting, but not yet collective recognition. The latter will not be long delayed. We are getting into a position to resume building next spring. A year ago this might have been of instantaneous effect. The stalemate of a year has produced an adverse credit situation that now has to be corrected. The building mechanics egregiously over-played their hand. Ruining themselves they destroyed many other persons who were their potential customers.

The railway brotherhoods are still pursuing the same blind policy. When the merchant finds sales slowing up he reduces prices and aims to attract customers and increase volume. The railway brotherhoods have seen their passenger and freight traffic go to pot, have seen many of themselves go out of employment, and they continue to proclaim that their prices remain unchanged. The railway companies have just raised rates instead of lowering them. It does not seem like common sense.

Railway companies are beginning to go into receiverships. They will then dictate wages, perhaps will not pay any at all. The brotherhoods do not apparently appreciate that they are ham-strung. They used to have the threat of the strike and the enlistment of public opinion in their favor out of a desire to avoid inconvenience. With the truckmen and the bus-men eager to take over the business that the railways relinquish the trainmen might now strike themselves into permanent unemployment. Already they have lost a golden opportunity to preserve public friendliness. They may still be able to save their face. If they do not bow

gracefully to the inevitable they may lose their protective legislation, their unions and their jobs.

Already is there a good deal of inquiry whether the protective legislation in their favor is constitutional. Why should not any railway company fix the rates that it can afford to pay and declare that they are what it is going to pay just as does a manufacturing company? The power of the brotherhoods was when they had the carriers hog-tied, or so conceived. The situation is now different owing to the truckmen, the bus-men and many unemployed trainmen, wherefore the law of supply and demand may resume its operation.

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## Gay Prismatic Colors in a Factory

THE Bureau of Foreign and Domestic Commerce of the Department of Commerce has just brought together scores of instances where industrial firms have made material progress during the depression in maintaining or increasing sales volume or profits. One of them is the case of a manufacturer of high-grade shoes, who attributes recent success to a prismatic color scheme of interior decoration. To quote the bulletin issued by the Bureau:

"This concern, to maintain payrolls, painted the machines, equipment, and inside of its plant, and used gay, bright and, where moving machinery was concerned, contrasting colors. All the colors of the rainbow were used. Employees took pride in voluntarily keeping clean the machines, floors, and the immediate surroundings. The surprising result of this effort to provide work was that it became an important factor in the profitable operation of the business, because: (1) Eye strain was eliminated resulting in: *a*, Amount of rejected products and damaged materials reduced to an insignificant minimum; *b*, Older employees able to compete with younger hands and brighter eyes, both in quantity and quality of workmanship; *c*, No reportable accidents for nine months. (2) Fatigue and nerve tension were eliminated. (3) Morale was improved. Better attitude toward work, in keeping with the general brightness and cheer of surroundings. (4) The sales force has been affected by the high-quality spirit of the production department and has successfully sold this quality factor. (5) Of increased advertising by employees, visitors and editors."

Visualizing men and women working in the midst of harlequin color, still and moving, the scene appears one of confusion and bewilderment. It would seem difficult to concentrate upon work. The operative may be pleasantly entertained. Good cheer may prevail. But not many manufacturers will be favorably impressed by the plan.

Much worthwhile study has been given to the subject of color in industrial plants, usually in connection with lighting. Certain colors have been proved restful to the eyes, and at the same time reflectors and not absorbers of light rays. The quest has been a background agreeable to the subconscious senses and not distracting to the conscious. This combines with ample, well directed lighting, good janitor service and proper ventilation to afford as close an approach as possible to ideal working conditions and consequent efficiency of labor. The rainbow color plan has advantages for publicity purposes, perhaps, but we wonder if it will be taken up as a means of increasing industrial output.

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## The Situation in Copper

THE situation in the world's copper industry has become very bad and producers are roundly blamed for their misconception, mismanagement and misconduct. Perhaps under each of those heads they have been to a certain extent reprehensible. Without essaying to be entirely extenuating it may be suggested, however, that they have been the victims of unusual and unpredictable circumstances.

In 1929 world consumption averaged about 175,000 tons a month. Production was somewhat in excess thereof, but there can never be close correlation and there is no reason to suppose that there was then an abnormal unbalance; nor any reason to suppose that the large consumption of the year evinced overbuilding in electrical plant and otherwise. On the contrary the judgment must be that the world needs more of such conveniences and facilities and that with normal progress the copper from the new Rhodesian mines will be required, as was then estimated.

In the early part of 1930 nearly everybody condoned the political policy of making work to furnish employment at prevailing scale of wages, to which the electrical and utility companies patriotically bowed; and extensive construction and use of copper continued. The copper producers did not generally, however, sense the artificiality of this and did not begin to trim sail early enough. Even as late as the third quarter of 1930 world consumption of copper appeared to be at the rate of about 150,000 tons a month.

Then at last, seeing the omen, producers conferred in November and agreed upon a sharp curtailment of production. One great foreign producer had actually been increasing its production during 1930, and its agreement to curtail only restored it to its *status quo ante*. No one at that time foresaw the incredible contraction in consumption that was going to occur during the next 10 months. Copper like lead and zinc and iron and steel is absorbed mainly in construction. In respect to each of them the economic trouble of 1930-31 has not been the capitalistic provision of excessive capacity that propagandists have been preaching but rather has been ascribable to an extraordinary contraction in all building.

Now, it is obvious that if consumption is contracting the only way whereby producers can avoid piling up stocks, locking up surplus and credit and incurring carrying charges is to reduce production to fit the demand. In lead and zinc that has been done with a good deal of exactitude. In copper the procedure is not so simple for the following reasons:

1. The time of processing is longer. If curtailment be ordered at the mines it will be three months before it will appear in the refineries.

2. The production of scrap in manufacturing is

large and as consumption contracts there is a larger and longer echo from the previous sale.

3. Copper is more than any other an international affair and is considerably subject to national politics. Thus there has been no curtailment of production of Europe. That of Germany, although of high cost, has been maintained by governmental subvention to keep men employed. Russia, which pays no attention to cost, strives its utmost to increase production.

Although world production was reduced to about 120,000 tons a month in 1931, stocks continued to accumulate for the reason that consumption reduced itself more. At the beginning of October the world's rate of consumption was about 105,000 tons. At the present time it is probably even less than that. After prolonged negotiations among themselves the principal producers of the world are about to agree upon a drastic curtailment which will bring the rate of production well below the rate of consumption and institute a reduction of stocks.

The grave situation in copper, which tortures manufacturers as well as producers, is not going to be a permanent situation. The chief use for copper is electrical, and the electrification of homes, railways and other conveniences of living is going to be resumed sooner or later, and probably on an increasing scale. The world's work is not all done.

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## Grinding Tungsten-Carbide Milling Cutters

(*Concluded from page* 1480)

**A fine smooth-cutting edge is the first essential for the successful operation of tungsten-carbide tools.**

**Grind with a plentiful supply of water and light pressure on a suitable free cutting wheel, properly trued and running without vibration. Wet grinding is much better and faster than dry grinding. If necessary to grind dry, however do *not* dip the hot tip in water to cool. Keep the wheel properly dressed and do not allow the tip to become overheated in either wet or dry grinding.**

**Maintain the proper angles as specified; grind from the front and side of tool as far as possible. If necessary to grind the top, grind it first, with the wheel rotating toward the cutting edge.**

**Keep the clearance angle beneath the cutting edge as small as possible, maintaining a straight clearance, and avoid the formation of a concave surface by the periphery of the wheel.**

With a little experience the grinding of tungsten-carbide tools will be found to be very simple. If the grinding is done wet, on suitable wheels of large size, the time required will be only very little more than for high-speed steel tools. The average time needed for rough and finish grinding a Widia tool complete at the Krupp plant is less than three minutes.

## Machine Tool Plant Keeps Separate Engineering Costs

(*Concluded from page* 1477)

date and improved. Engineering costs are a large item in the cost of maintaining factory production and they must be properly allocated to the individual products to determine the profit-making product from the one that is causing losses.

The engineer is put on his toes and he makes a sincere effort to keep his work within the bounds of economy when he has definite marks or estimates to aim at. If he does not, he knows that he will be held accountable for all deviations from the predetermined estimates and must furnish conclusive evidence as to why the estimates were not met.

To my mind the day is fast approaching when engineering department workers will be working to definitely established standards and their pay will be based accordingly. With the establishment of engineering and development standards, it would be a comparatively easy matter to develop an incentive plan of wage payment that would be beneficial to the engineering staff, as well as react to the general benefit of the company and all concerned.

It is my sincere belief that, by the careful application of the principles outlined above, the costs of engineering activities in most every type of business may be effectively controlled and at the same time such costs may be actually reduced. Management will certainly be given the facts concerning this department of their business and may then use whatever methods are necessary to make that department as effective and economical as the needs of the particular business dictate. Correct and adequate information is vital. These methods will enable the manager to obtain information that is correct and adequate, informative and constructive.

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## Analyzing Rustless Steel

METHODS for inspecting and testing high chrome-nickel alloy steel for the second heightening of the Assouan Dam in Egypt has been developed by the British National Physical Laboratory, and the consulting engineers for the dam.

Certain of the methods proposed by the British National Physical Laboratory for chemical analysis of this class of steel have been adopted as standard by the manufacturers. The recommended method of analysis consists of determining the carbon content with separation by means of copper chloride solution, and subsequent combustion of the residue. After a series of tests, direct combustion, with addition of a small quantity of tin to the drillings, has been found to be reliable. For determination of the sulphur content, a gravimetric method is used, as the evolution method gives low values, partly because, during solution of the sample being tested, the attack of acid on these alloys is slow.

Manganese content is determined by a modified persulphate-bismuthate method, the manganese first being precipitated with ammonium persulphate in the usual way.

# Steel Operations in Further Recession; Advances and Declines in Prices

## Year-End Buying Retrenchment Brings Drop in Ingot Output—Wire Products Quotations Higher—Some Sheet Grades Lower

A DECLINE in steel ingot production to 26½ per cent of the country's capacity, against an average output of 30 per cent in November, further weakness in some finished steel products and a drop in THE IRON AGE steel scrap price composite to $8.58, the lowest on record, are developments that emphasize the year-end recession in business activity.

To counterbalance the usual December slowing down, the steel industry had expected considerable support from the automobile industry, which has materialized only in part. Meanwhile, first quarter buying is generally being delayed by motor car manufacturers as well as other steel consumers, a situation brought about to some extent by price uncertainties.

WITH steel inventories already at an extremely low point, there is reason for believing, however, that any further sharp contraction in purchasing this month will be followed by a corresponding recovery in January, when replenishment of stocks will be an important factor, together with larger buying by the automobile industry and possibly some railroad purchases, if the financial condition of the carriers is then approaching solution.

After a year in which steel production will average only 38 per cent of capacity—or about the 1921 rate—and six months of 30 per cent average operations, the steel industry can logically expect some improvement in 1932, but it is recognized that the present period of readjustment will extend at least through the early months of the new year and affect somewhat the seasonal rise that normally can be counted on.

IRREGULAR price movements characterize the current downward trend. On the one hand, there have been announced advances on wire rods and merchant wire products, amounting to $2 a ton on the semi-finished steel and $1 to $3 on the finished items, and an effort on the part of hot-rolled strip makers to raise their quotations $1 a ton for first quarter. Sheet steel finishes used largely by the automobile industry have weakened, auto body stock and light cold-rolled material having been sold at concessions of $2 a ton and heavy hot-rolled sheets at $1 a ton lower.

Producers of plates, shapes and bars will announce first quarter prices soon, and an effort may be made to reestablish the formal quotations of 1.60c., Pittsburgh, and 1.70c., Chicago, that were in effect during most of this quarter. Plates and shapes continue to show weakness, but bars at Pittsburgh are held firmly at 1.60c. An unchanged price of 2.10c., Pittsburgh, on cold-finished bars has been named for first quarter.

The upward changes in merchant wire products include extras for mixed and pool carloads and on less-carload lots, a step that is expected to eradicate some of the distribution ills that have affected the wire products industry.

Ferromanganese prices for 1932 contracts have been reduced $8 to $10 a ton, and even larger reductions have been made on some other ferroalloys. Spiegeleisen is $1 a ton lower at $26 to $27.

THERE is keen disappointment in the fact that automobile companies' orders have not been larger. The Ford Motor Co. has released some business in sheets and strips, but the bulk of its expected purchases is still delayed. The Ford schedule is reported to be 20,000 cars in December and 100,000 in January. Chevrolet is expected to produce 37,000 units this month.

Aside from an order for 10 locomotives placed by the Delaware, Lackawana & Western, with six more to be built in its own shops, railroad purchases are negligible. Building construction also continues in its seasonal slump, awards of fabricated structural steel in the week having been only 9500 tons, much below even the recent small average. Tin plate is the most active steel product, but current rollings are mostly for shipment next month or later.

STEEL ingot production in November broke the downward trend since last March, with a 30 per cent rate against 27.76 in October and a daily output of 63,747 tons for 25 working days against the 58,977 tons for each day in the previous month. With two less working days, November topped the total October production by 1308 tons. The 11 months' total is 23,597,796 tons against 37,306,740 in the corresponding period of 1930, a drop of 37 per cent. If December does not fall below the low October record, the year's total will be slightly in excess of 25,000,000 tons.

THE Interstate Commerce Commission has permitted the railroads to assess an additional rate of 12c. a ton on pig iron and scrap and 6c. a ton on iron ore, coal, mill scale, limestone and fluorspar instead of charges of $6 and $3 a car as prescribed in its decision in the so-called 15 per cent rate case. Some other modifications of the order have also been granted, as requested by the railroads. New rates that have gone into effect on long hauls from Eastern points to Western territory have lessened the advantage of Chicago mills in that section.

Declines in steel scrap of 25c. a ton at Chicago and in eastern Pennsylvania bring THE IRON AGE scrap composite down to $8.58. The finished steel average is lower at 2.095c. a lb. and that for pig iron is unchanged at $14.96 a gross ton.

# ▲▲▲ A Comparison of Prices ▲▲▲

**Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics**

## Pig Iron,

| *Per Gross Ton:* | Dec. 8, 1931 | Dec. 1, 1931 | Nov. 2, 1931 | Dec. 9, 1930 |
|---|---|---|---|---|
| No. 2 fdy., Philadelphia | $15.51 | $15.51 | $15.76 | $17.76 |
| No. 2, Valley furnace | 16.00 | 16.00 | 16.00 | 17.00 |
| No. 2 Southern, Cincinnati | 14.69 | 14.69 | 14.69 | 14.69 |
| No. 2, Birmingham | 12.00 | 12.00 | 12.00 | 14.00 |
| No. 2 foundry, Chicago* | 17.00 | 17.00 | 17.00 | 17.50 |
| Basic, del'd eastern Pa. | 16.25 | 16.25 | 16.75 | 17.75 |
| Basic, Valley furnace | 15.00 | 15.00 | 15.00 | 17.00 |
| Valley Bessemer, del'd P'gh | 18.26 | 18.26 | 18.26 | 19.26 |
| Malleable, Chicago* | 17.00 | 17.00 | 17.00 | 17.50 |
| Malleable, Valley | 16.50 | 16.50 | 16.50 | 17.50 |
| L. S. charcoal, Chicago | 23.04 | 23.04 | 25.04 | 27.04 |
| Ferromanganese, seab'd carlots† | $75.00 | $85.00 | $85.00 | 80.00 |

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Ferromanganese quotations adjusted to carload unit; larger quantities at discount.

## Rails, Billets, etc.,

| *Per Gross Ton:* | | | | |
|---|---|---|---|---|
| Rails, heavy, at mill | $43.00 | $43.00 | $43.00 | $43.00 |
| Light rails at mill | 34.00 | 34.00 | 34.00 | 36.00 |
| Rerolling billets, Pittsburgh | 29.00 | 29.00 | 29.00 | 31.00 |
| Sheet bars, Pittsburgh | 29.00 | 29.00 | 29.00 | 31.00 |
| Slabs, Pittsburgh | 29.00 | 29.00 | 29.00 | 31.00 |
| Forging billets, Pittsburgh | 35.00 | 35.00 | 35.00 | 36.00 |
| Wire rods, Pittsburgh | 35.00 | 35.00 | 35.00 | 35.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, grvd. steel, P'gh, lb. | 1.60 | 1.60 | 1.60 | 1.60 |

## Finished Steel,

| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
|---|---|---|---|---|
| Bars, Pittsburgh | 1.60 | 1.60 | 1.60 | 1.60 |
| Bars, Chicago | 1.60 | 1.60 | 1.70 | 1.70 |
| Bars, Cleveland | 1.65 | 1.65 | 1.65 | 1.65 |
| Bars, New York | 1.93 | 1.93 | 1.93 | 1.93 |
| Tank plates, Pittsburgh | 1.55 | 1.60 | 1.60 | 1.60 |
| Tank plates, Chicago | 1.60 | 1.60 | 1.70 | 1.70 |
| Tank plates, New York | 1.83 | 1.83 | 1.88 | 1.88 |
| Structural shapes, Pittsburgh | 1.50 | 1.50 | 1.60 | 1.60 |
| Structural shapes, Chicago | 1.60 | 1.60 | 1.70 | 1.70 |
| Structural shapes, New York | 1.80¼ | 1.85¼ | 1.85½ | 1.85½ |
| Cold-finished bars, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.60 |
| Hot-rolled strips, Pittsburgh | 1.50 | 1.50 | 1.50 | 1.55 |
| Cold-rolled strips, Pittsburgh | 2.05 | 2.05 | 2.05 | 2.25 |

## Finished Steel,

| *Per Lb. to Large Buyers:* | Dec. 8, 1931 Cents | Dec. 1, 1931 Cents | Nov. 2, 1931 Cents | Dec. 9, 1930 Cents |
|---|---|---|---|---|
| Hot-rolled annealed sheets, No. 24, Pittsburgh | 2.40 | 2.40 | 2.40 | 2.35 |
| Hot-rolled annealed sheets, No. 24, Chicago dist. mill | 2.50 | 2.50 | 2.50 | 2.45 |
| Sheets, galv., No. 24, P'gh | 2.90 | 2.90 | 2.90 | 2.95 |
| Sheets, galv., No. 24, Chicago dist. mill | 3.00 | 3.00 | 3.00 | 3.10 |
| Hot-rolled sheets, No. 10, P'gh | 1.70 | 1.70 | 1.70 | ... |
| Hot-rolled sheets, No. 10, Chicago dist. mill | 1.80 | 1.80 | 1.80 | ... |
| Wire nails, Pittsburgh | 1.90 | 1.90 | 1.90 | 1.90 |
| Wire nails, Chicago dist. mill | 1.95 | 1.95 | 1.95 | 1.95 |
| Plain wire, Pittsburgh | 2.20 | 2.20 | 2.20 | 2.20 |
| Plain wire, Chicago dist. mill | 2.25 | 2.25 | 2.25 | 2.25 |
| Barbed wire, galv., Pittsburgh | 2.55 | 2.55 | 2.55 | 2.60 |
| Barbed wire, galv., Chicago dist. mill | 2.60 | 2.60 | 2.60 | 2.75 |
| Tin plate, 100-lb. box, P'gh | $4.75 | $4.75 | $4.75 | $5.00 |

## Old Material,

| *Per Gross Ton:* | | | | |
|---|---|---|---|---|
| Heavy melting steel, P'gh | $10.25 | $10.25 | $10.12½ | $12.75 |
| Heavy melting steel, Phila. | 7.75 | 8.00 | 8.00 | 11.00 |
| Heavy melting steel, Chicago | 7.75 | 8.00 | 8.00 | 10.00 |
| Carwheels, Chicago | 8.50 | 8.50 | 9.00 | 11.75 |
| Carwheels, Philadelphia | 11.50 | 11.50 | 11.50 | 14.00 |
| No. 1 cast, Pittsburgh | 10.00 | 10.00 | 10.00 | 12.50 |
| No. 1 cast, Philadelphia | *10.00* | 10.50 | 10.50 | 12.00 |
| No. 1 cast, Ch'go (net ton) | 8.50 | 8.50 | 8.50 | 9.50 |
| No. 1 RR. wrot., Phila. | 9.50 | 9.50 | 9.50 | 13.50 |
| No. 1 RR. wrot., Ch'go (net) | 6.50 | 6.50 | 6.50 | 8.50 |

## Coke, Connellsville,

| *Per Net Ton at Oven:* | | | | |
|---|---|---|---|---|
| Furnace coke, prompt | $2.40 | $2.40 | $2.40 | $2.50 |
| Foundry coke, prompt | 3.50 | 3.50 | 3.50 | 3.50 |

## Metals,

| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
|---|---|---|---|---|
| Lake copper, New York | 6.87½ | 6.87½ | 7.37½ | 12.12½ |
| Electrolytic copper, refinery | 6.25 | 6.50 | 6.75 | 10.75 |
| Tin (Straits), New York | *20.65* | 21.00 | 22.25 | 25.00 |
| Zinc, East St. Louis | **3.17½** | 3.12½ | 3.15 | 4.20 |
| Zinc, New York | **3.52½** | 3.47½ | 3.50 | 4.55 |
| Lead, St. Louis | 3.65 | 3.65 | 3.80 | 4.95 |
| Lead, New York | 3.85 | 3.85 | 4.00 | 5.10 |
| Antimony (Asiatic), N. Y. | *6.25* | 6.50 | 6.50 | 7.10 |

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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# ▲▲▲ The Iron Age Composite Prices ▲▲▲

| | Finished Steel | Pig Iron | Steel Scrap |
|---|---|---|---|
| Dec. 8, 1931 | 2.095c. a Lb. | $14.96 a Gross Ton | $8.58 a Gross Ton |
| One week ago | 2.102c. | 14.96 | 8.75 |
| One month ago | 2.116c. | 14.96 | 8.75 |
| One year ago | 2.121c. | 16.02 | 11.25 |
| | Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output. | Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham. | Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago. |

| | High | Low | High | Low | High | Low |
|---|---|---|---|---|---|---|
| 1931 | 2.142c., Jan. 13 | 2.095c., Dec. 8 | $15.90, Jan. 6 | $14.96, Nov. 10 | $11.33, Jan. 6 | $8.58, Dec. 8 |
| 1930 | 2.362c., Jan. 7 | 2.121c., Dec. 9 | 18.21, Jan. 7 | 15.90, Dec. 16 | 15.00, Feb. 18 | 11.25, Dec. 9 |
| 1929 | 2.412c., April 2 | 2.362c., Oct. 29 | 18.71, May 14 | 18.21, Dec. 17 | 17.58, Jan. 29 | 14.08, Dec. 3 |
| 1928 | 2.391c., Dec. 11 | 2.314c., Jan. 3 | 18.59, Nov. 27 | 17.04, July 24 | 16.50, Dec. 31 | 13.08, July 2 |
| 1927 | 2.453c., Jan. 4 | 2.293c., Oct. 25 | 19.71, Jan. 4 | 17.54, Nov. 1 | 15.25, Jan. 11 | 13.08, Nov. 22 |
| 1926 | 2.453c., Jan. 5 | 2.403c., May 18 | 21.54, Jan. 5 | 19.46, July 13 | 17.25, Jan. 5 | 14.00, June 1 |
| 1925 | 2.560c., Jan. 6 | 2.396c., Aug. 18 | 22.50, Jan. 13 | 18.96, July 7 | 20.83, Jan. 13 | 15.08, May 5 |

# Pittsburgh Steel-Making Rate Steady; Declines at Wheeling and in Valleys

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PITTSBURGH, Dec. 8.—No marked change in the rate of aggregate demand for steel products has been noticeable in the first week of the new month. At the same time only minor changes in steel ingot production in the Pittsburgh district are reported, and the average rate is estimated at 27 per cent for the second week. The leading interest is running at better than 30 per cent of capacity and has blown in a blast furnace. The increase in iron production will be offset later in the month by the proposed banking of an independent steel company stack.

In the Valleys, ingot production has dropped rather sharply to about 25 per cent of capacity, while output in the Wheeling area has declined to about 40 per cent. Schedules of finishing mills have not changed much in the aggregate, although sheet production is off slightly and strip mills are barely holding their own.

While miscellaneous consumption of steel products seems to be receding a little, the loss thus far in the month has been much under expectations for the period. This only proves the long-known fact that consumer inventories are at a minimum and that some steel must be taken from week to week if general manufacturing is continued on any scale. On this basis, steel requirements are not expected to drop sharply until the last week of the year. In the meantime, there is always the prospect of a gain in the orders of the automobile industry, which have not yet been felt to any extent. Under the circumstances, there is a growing belief in the trade that production of steel this month will not fall much under the low October rate, although it cannot be expected to equal that of November.

Prices are giving ground in some lines, but an advance for first quarter has been announced on merchant wire products. Wire makers have also announced the institution of extras on less-carload lots as well as on mixed and pool carloads, one of the most constructive steps taken by the industry in a long time. Manufacturers' wire prices are unchanged, but wire rods will be raised $2 a ton. The advances on merchant wire products range from $1 a ton on nails to $3 on one or two other products. Makers of sheets and strip steel have not

**Pittsburgh district ingot output estimated at 27 per cent for second week. Operations decline at Wheeling and in Valleys.**

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**Miscellaneous consumption of steel receding a little this month, but no sharp drop is expected.**

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**Steel prices giving ground in some lines. An advance for first quarter on merchant wire products announced.**

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**No revision of pig iron prices for first quarter is indicated.**

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**Scrap market dull, but prices are fairly steady.**

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made announcements of first quarter prices, but some business has been booked at present levels. On cold-finished steel bars the present 2.10c., Pittsburgh, price has been reaffirmed. Merchant bars are fairly well held at 1.60c., Pittsburgh, but plates and shapes continue weak.

Ferromanganese prices for 1932 represent drops of $8 to $10 a ton, and much greater reductions have been made on some other ferroalloys.

Pig iron quotations are unchanged and no revision for the first quarter is in prospect. The scrap market is dull, but prices are fairly well held.

## Pig Iron

Sales and shipments are both very light, and foundries are making present low stocks last through the month if possible. Most of them will suspend operations for about two weeks in the near future. Scarcely any first quarter inquiry has appeared, and prices are tested only on carload lots. The local merchant furnace is still quoting malleable, foundry and Bessemer iron at $17, Neville Island, while Valley makers are quoting $16 on foundry grade, and $16.50 on malleable and Bessemer. The basic market is nominal in the absence of sales.

## Semi-Finished Steel

Makers of wire rods have announced an advance of $2 a ton for first quarter business, bringing the price to $37, Pittsburgh. Material under contract at $35 must be shipped by Dec. 31. Shipments this month compare favorably with those of the corresponding November period. No first quarter inquiry has appeared, and little business is coming out to test the market price of $29, Pittsburgh, on billets, slabs and sheet bars. However, this figure has been shaded sharply in one or two instances in which steel companies had a surplus which they wished to dispose of quickly.

## Bars, Plates and Shapes

While releases last week were somewhat better than in the last week of November, the trend of demand still seems to be downward. Shipments of structural steel and reinforcing bars are gradually diminishing as weather conditions bring an end to outside work. The demands from manufacturing consumers of bars, plates and shapes are very small. Pittsburgh fabricators are interested in a dam and retaining wall to be built at Davenport, Iowa, requiring 5000 tons of steel, on which bids are being taken this week. No other outstanding jobs are before the trade. Demand for alloy bars and other bar mill products going to the automobile industry has improved slightly, but is offset to some extent by contraction in other lines. No railroad business is coming out, and barge inquiries are generally being deferred until after the turn of the year. Prices show no definite change, although plates are more freely available at a concession of $1 a ton from the recent 1.60c., Pittsburgh, level. Bars appear to be well maintained at 1.60c., Pittsburgh, while shapes are quotable at 1.50c. to 1.60c.

## Cold Finished Steel Bars

Specifications are holding at recent levels, but show none of the improvement that was expected to result from December requirements of the automobile industry. A large majority of buyers are still paying 2.10c., Pittsburgh, and more than three-fourths of the current tonnage is going at this level. This quotation has been reaffirmed for first quarter.

## Tubular Goods

Prospective line pipe tonnage is still getting considerable attention from pipe makers, but most of them are not very hopeful for the placing

of much business during the winter. The Continental Construction Corpn., Chicago, is reported to have postponed closing against its recent inquiry for 170 miles of 20-in. pipe, and the order may be held up until January. A 10-in. oil line for the Ajax Pipe Line Co., extending from Oklahoma to northern Illinois, seems to be still in the formative stage. Pipe business in general shows little change, except possibly a slight recession in demand for standard material. Oil country goods are very dull, and mechanical tubing is a shade more active.

### Wire Products

Wire makers have announced an important revision in quoting prices on merchant wire products to become effective in the first quarter. Nails have been advanced $1 a ton to $1.95 a keg, Pittsburgh, in carload lots only. Mixed carload and joint carloads are quoted at $2.05; pool cars at $2.20., and less carloads at $2.35. The extras apply on all business whether coming from a jobber or dealer. These changes are expected to correct some of the ills which have brought virtual price demoralization in some instances. The nail market has recently been rather firm at $1.90. Galvanized and polished fence staples are up $3 a ton, while annealed fence wire and galvanized wire are unchanged at 2.35c. and 2.80c. a lb., respectively. Manufacturers' wire continues at 2.20c., Pittsburgh. These prices are subject to the usual differentials at basing points other than Pittsburgh, and are effective on all specifications placed after Dec. 31.

### Sheets

Specifications were somewhat lighter the past week, and production has dropped under the 30 per cent level which prevailed during the greater part of November. Releases from the automobile industry continue light in spite of reports of heavier production schedules by leading makers of low-priced cars during December. Demand from other sources is very dull.

No formal announcement of first quarter prices has been made, and several companies have quoted on forward business at the prevailing schedules. Under the circumstances it is assumed that no change will be made. Present quotations on hot-rolled and annealed sheets, No. 24 gage, are fairly well maintained at 2.40c., Pittsburgh, while galvanized sheets at 2.90c. are well held except in the South. Continued concessions on auto body stock in the Detroit territory have resulted in a definite weakening of the market, which is now quoted at 3c. to 3.10c., Pittsburgh. Hot-rolled sheets, No. 10 gage, are also weaker, reflecting competition of plate mills, and are now quotable at 1.65c. to 1.70c., Pittsburgh. The other finishes of sheets are unchanged.

### Tin Plate

It is estimated that fully 90 per cent of the buyers of tin plate have now placed their contracts for the first half of 1932, and the remainder are expected to follow in the next week or two. A report that the base price may be reduced further as of Jan. 1 is not credited by the larger makers in this district. Operations continue at close to 50 per cent of capacity, with anticipated tonnage playing a large part in current schedules. However, some large makers made considerable stock during the last half of this year which was not ordered out, and which will reduce the aggregate of forward tonnage to be rolled during December.

### Strip Steel

Some of the strip makers in this territory have received small releases from certain automobile makers in the last week, but the larger manufacturers of low-priced cars have not released nearly enough strip to supply their requirements if reported December schedules are carried out. Demand from other sources is dull, and production of hot-rolled strip has fallen under 25 per cent. The rate on cold-rolled is even lower.

Makers in the Pittsburgh and Valley districts have made no announcement regarding first quarter prices. Fender stock is lower at 3c. to 3.10c.

### Coke and Coal

The market on foundry coke has been affected adversely by reduced operations in local plants. The furnace grade is also very dull, and prices continue nominal at $2.40, Connellsville. Domestic coke is somewhat more active, as is domestic coal.

### Ferroalloys

Makers of ferromanganese have announced 1932 prices of $72 to $75 a ton, seaboard. These quotations represent reduction of $8 to $10 a ton from previous schedules. Quotations on some other ferroalloys have also been revised downward. Steel companies have failed to show much interest in their next year's requirements, but contracting is expected to go forward now that prices are out.

### Old Material

Reports that the No. 1 heavy melting steel in the Pennsylvania Railroad list brought a much higher price than had been expected cannot be confirmed, but it is generally believed that at least $10.50 was obtained. Practically no buying of steel-making scrap has been reported in the last week, and mill offering prices range from $10 to $10.25. Dealers are unable to pick up much steel for shipment against old orders at less than $10. Hydraulic compressed sheets are still available at a very narrow range of prices, but dealers are able to pick up a little material at as low as $9.75. No changes are reported in the other grades of scrap, which are generally unsalable in the present market.

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## St. Louis Pig Iron Users Still Hesitate in Placing Contracts for the First Quarter

ST. LOUIS, Dec. 9.—Melters still hesitate about placing orders for their first quarter requirements of pig iron, being disposed to await the turn of the year in the hope that they will get a better idea of the volume of business ahead for them. However, shipments of the St. Louis Gas & Coke Corpn. are reported to be holding up well, as a result of melters taking iron against contracts, and it is expected that all fourth quarter schedules will have been completed before the end of the year. While stove plants report a greater movement of their products as a result of recent colder weather, they are not buying any more pig iron for the present. Pig iron prices are firm and unchanged.

### Finished Material

The reduction of $2 a ton on "attractive lots" of plates, shapes and bars, as made in Chicago, has not been met in this market; probably for the reason that no sizable tonnages have been offered to the mills. Business in these lines continues quiet.

An ordinance authorizing a bond issue of $3,700,000 for the municipal auditorium has been approved by the Board of Public Service. If adopted by the Board of Estimate and Aldermen, it is stated that a contract will be ready for award by Feb. 1. The State of Missouri opened bids Dec. 3 on bridge and paving projects requiring 1500 tons of reinforcing bars and 765 tons of structural steel. Structural steel fabricating plants report trade slow and operations are said to be at about 20 per cent of capacity.

### Old Material

There was no important consumer buying during the week, but some dealers believe that the mills will come into the market again shortly after Dec. 15, so that whatever is received will be on next year's inventory. Dealers are now engaged in covering against recent sales. It is said that specialties are scarce. Miscellaneous standard-section rails, wrought iron bars and transoms, No. 1 railroad wrought, and steel angle bars are 25c. a ton lower, and steel car axles are 50c. less. Railroad lists: Baltimore & Ohio, 2905 tons; Chicago, Rock Island & Pacific, 47 carloads.

# Chicago Mills Feel Effect of Year-End Curtailment of Steel Buying

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CHICAGO, Dec. 8.—Price movements are the center of interest here. It is not improbable that producers of plates, shapes and bars will make announcements for first quarter in the next week or 10 days. Wire producers are advancing quotations on nails, staples and barbed wire, and an effort is being made to get higher prices for hot-rolled strip. Ferromanganese, for 1932 contracts, is off $8 a ton on large lots. Heavy melting steel is 25c. a ton lower. Small lots of cast iron pipe have been sold at a reduction of $2 a ton. Producers of wire rods are putting up prices $2 a ton.

The whole picture reflects somewhat of a determined effort by sellers not only to establish more firmly present quotations, but to put into effect advances wherever possible. They are laboring, however, under the handicap of uncertain market conditions for the remainder of this year and the first quarter of 1932.

In addition to the problems offered by price structures, there is also a major topic in the new freight rates on iron and steel which went into effect Dec. 3. Of special moment to Chicago producers are reductions in rates on long hauls from Eastern basing points to destinations in Western territory and rather sharp increases from Chicago to points within the same territory. As an example, the rate from Chicago to St. Paul is increased 13½c. per 100 lb. and the rate from Pittsburgh to St. Paul is reduced.

Specifications for finished steel show some improvement, a direct reflection of more activity by automobile manufacturers and builders of farm equipment. On the other hand, sales are lighter, which is not unexpected so far as December deliveries are concerned, but disappointing as regards needs in the first quarter.

Ingot output is off slightly to an average of 22 per cent of capacity.

**Operations off slightly at Chicago mills. Specifications for steel fairly steady, but new sales are light.**

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**Price movements the principal development of the week.**

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**Wire rods and merchant wire products advanced. Ferromanganese reduced. Cast iron pipe down $2 a ton.**

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**New freight rates from Eastern points lessen advantage of Chicago mills in Western territory.**

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**Scrap market weak. Heavy melting steel off 25c. a ton.**

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### Pig Iron

Northern foundry iron is somewhat firmer at $17 a ton, local furnaces, but the market is not yet without some irregularity. Specifications are turning lighter, and indications are now rather clear that December shipments will not equal the total in November. New buying is also less active, though inquiry still remains at a fair level. Two furnaces are blowing, with output far below rating. The charcoal iron market is quiet, with prices generally leaning to the lower quotation, namely, $20 a ton, furnace. Quotations are steady on Southern iron, but the movement is limited in this direction.

### Ferroalloys

Contract prices for ferromanganese have been announced. The new quotations are $72 a ton, seaboard, for lots of 2000 tons or more and $75 for carloads.

### Bolts, Nuts and Rivets

Rather contrary to expectations, specifications for these commodities are showing improvement and, if the present rate is maintained, December movement may top shipments in November. New support is coming from automobile manufacturers and builders of farm equipment.

### Wire Products

Quotations on barbed wire, staples and nails have been advanced. Present prices for wire and fencing are being carried forward for the first quarter. Barbed wire and nails are marked up $1 a ton and prices on staples are up $3 a ton from the levels that have been prevailing. Tonnages reaching mills are more variable, though the aggregate is changing little. The trade looks for more liberal support from automobile manufacturers after Dec. 15. In the Southwestern farm areas there is slight improvement in demand. There is a general feeling that liquidation in farm districts is about completed and that demand for commodities in general will gradually increase there. Orders for copper wire are slightly heavier.

### Cast Iron Pipe

Price ranges are narrowing as the smaller and less attractive tonnages bring out lower quotations. Cast iron pipe 6 in. and larger in diameter is now quotable at $32 to $34 a ton, Birmingham. South Milwaukee has rejected all bids and will open new bids Dec. 14 on 1000 tons needed. Galesville, Wis., has placed a small tonnage with American Cast Iron Pipe Co. A fair tonnage will be needed for Government lock work in Illinois and Wisconsin. Public utilities are giving no indications that they will come into the market in December for next year's requirements. They usually make their wants known about this time of year.

### Hot-Rolled Strip

One producer here is announcing a price advance of $1 a ton. The new quotations are to take effect at once and are to apply for delivery in December and the first quarter. Forward contracting is dull. Only moderate increases are noted in specifications from automobile manufacturers. Output ranges from 15 to 20 per cent of capacity.

### Structural Material

Fabricators, in summing up the prospects in this district, find there are about 26,000 tons in active jobs and about 50,000 tons additional in prospective work. Much of the active work is in the form of bridges, of which many are to be built in Illinois. Minnesota and Missouri have highway bridge plans and Colorado expects to develop a program in January, by which time it is thought Federal aid will have been announced. About 4000 tons will be needed for highway bridges at Seneca and Morris, Ill. It is reported here that work on the Hoover Dam is progressing ahead of schedule. Evidently steel needs are not far in the future.

### Sheets

Specifications are becoming more irregular and some units in this dis-

trict did not start until Tuesday, with schedules arranged for only two or three days. Although first quarter prices have been announced, there is practically no activity in first quarter commitments. Spot purchases also are at a very low level. Output ranges from 20 to 25 per cent of capacity.

### Rails and Track Supplies

Reports reaching here are that the Colorado Fuel & Iron Co. is calling men back to work in preparation for starting its rail mill. This mill took a large part of the Santa Fe order. Rail mill operations in the Chicago district remain low, but fairly steady. New inquiries and purchases are absent.

### Plates

Two orders for tank steel total 3400 tons, and fresh inquiries are for 3000 tons, of which 2000 tons is for oil producers in the Southwest and 1000 tons is for export. Some attractive tonnage is promised from the Hoover Dam project. There will be included some heavy plates for penstocks. Specifications from car builders are up slightly. The tonnage, however, is small.

### Reinforcing Bars

Pressure against prices remains rather severe notwithstanding that estimators are somewhat busier. Rail steel bars are now quoted a flat 1.40c. a lb. for highway slabs, bridges and culverts. Heretofore bridge and culvert bars have brought $2 a ton above slab work. A small amount of reinforcing tonnage is still moving to road contractors, who, on account of open weather, have prolonged their work season. The trade is looking forward to inquiries for additional highway bridges in Illinois.

### Bars

There is a slightly larger flow of bars to automobile manufacturers and builders of farm equipment. Most users are covered for the remainder of the year, and there is little interest in first quarter requirements. Better feeling in rural districts is reflected in small but new demand for rail steel bars by manufacturers of barn equipment. This industry has been dormant for many months.

### Wire Rods

Producers are announcing advances of $2 a ton, making the Chicago price range $36 to $38. Demand is sluggish.

### Old Material

Gary mills have purchased a few thousand tons of heavy melting steel at $8 a ton, which is 25c. a ton below the last sale made to a consumer whose specifications call strictly for No. 1 heavy melting steel. One local mill is still holding back shipments. Though incoming tonnages are not large, they evidently are of sufficient size to influence price levels. Cast iron borings are off 50c. a ton and some dealers expect quotations on this commodity to sag still further. Axle turnings are scarce, and prices are relatively strong. Inquiry for immediate delivery is lagging more as the end of the year approaches. On the other hand, quite a few users of scrap are showing some interest in tonnages they hope to make use of after the turn of the year.

### Coke

Shipments of Northern product foundry coke are practically stationary, as the tonnage needed for heating purposes about offsets the drop in coke used for melting iron. Prices are steady at $7.50 a ton, local ovens. Contracting for 1932 is making headway.

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## Youngstown Operations Lower as the Mills Still Await Larger Orders from Automobile Industry

YOUNGSTOWN, Dec. 8.—With specifications from the automobile industry still below the expectations of Valley steel mills, the new month has brought little encouragement to the industry. General demand for finished steel products is beginning to reflect the usual December contraction, and both mills and consumers are scheduling their operations to bring inventories to an absolute minimum to reduce the year-end taxes in Ohio.

Open-hearth operations this week have fallen under 25 per cent of capacity, largely because of suspension of production at the Warren, Ohio, plant. At this point, where five furnaces have been operating recently, repairs are being made to the blooming mill, which will require about 10 days. It is planned now to resume production on Dec. 17. The loss in production at Warren will be offset to some extent by increased production at the other plants of the company. Finishing mill schedules are showing less change, although production of both sheets and strip steel is being maintained on a rather uncertain basis. On sheets the general average ranges from 25 to 30 per cent, while strip mill output is lower. Some of the pipe units in the district are getting sufficient tonnage to operate two or three days each week, but the average for the pipe industry as a whole is not above 30 per cent. Wire production has shown little gain, as specifications from the automobile industry have failed to improve significantly.

First quarter prices are receiving some attention, but consumers generally are not showing much interest in their future requirements. With the exception of a few large inquiries from the automobile industry, forward contracting is lethargic and steel makers are making no effort to hurry buyers in making commitments. The only major change in prices announced thus far is in wire products, where advances of $1 to $3 a ton have been announced on the merchant lines. Schedules have also been revised, adding a premium to small-lot purchases. Nails in carload lots are quoted for first quarter at $1.95, Pittsburgh, but manufacturers' wire is unchanged at 2.20c., Pittsburgh. Makers have named Dec. 31 as the last day for specifications against old contracts, and this move is expected to stimulate releases in the latter half of the month.

While makers of sheets and strip have not made formal announcement regarding first quarter prices, some business has been placed at recent levels, but only when consumers have insisted on placing orders. Thus far the flat rolled price schedules have been well maintained, except on auto body sheets and other flat rolled material going to the automobile industry. Bars are well maintained at 1.60c., Pittsburgh, and this quotation will be extended into the new year. Pipe prices are reported to be considerably more regular than was the case earlier in the year.

The market on raw materials is very quiet, with scarcely any buying of pig iron reported. Lake Erie furnaces are competing for business in much of the natural Valley territory, and in some cases are naming prices under the regular schedules. Scrap prices are weaker, with heavy melting steel quoted at not over $9.75 a ton, and hydraulic compressed sheets offered at $9.50.

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## New England Pig Iron Sales About 1150 Tons

BOSTON, Dec. 8.—Pig iron sales for the week were about 1150 tons, just about on a par with those of the previous week, and included three 100-ton lots to Connecticut consumers, the largest individual sales. Prices on domestic brands are holding well, but Dutch iron is reported as offered in Rhode Island at $17.50 to $18 a ton, delivered, without takers. Outlook for sales the remainder of 1930 are rather slim, as the New England melt is back to a shade less than 20 per cent of rated capacity.

### Old Material

Current business is confined to an occasional car of material. The dullness here is accentuated by a lack of buying by the American Steel & Wire Co., Worcester, Mass. Prices are unchanged.

# Cleveland Steel Output Lower; Some Automobile Buying

## Demand from Miscellaneous Sources Very Light—Price Irregularities on Some Products

CLEVELAND, Dec. 8.—Some additional tonnage of steel was placed by the automotive industry during the week, but the demand from other sources was rather limited and confined to small lots. The Ford Motor Co. placed sufficient tonnage of sheets and strip steel to start the manufacture of its new models, but is still deferring round lot buying that will be required to put its plant on a production basis. Other automobile companies are buying rather sparingly and evidently plan to limit production this month to enough cars to stock their dealers.

Steel plant operations in Cleveland again declined this week with the shutting down of one open-hearth furnace. Local plants are running at 32 per cent of ingot capacity, having got back to the same rate as at the start of November.

Some interest is being shown in the price situation for the first quarter, although there is little inclination among buyers to cover for that delivery. A leading producer has named the present price of 1.60c., Pittsburgh, for plates and shapes and 1.65c., Cleveland, for steel bars for the coming quarter and has closed a few contracts for that delivery. Pressure for concessions is still coming from the motor car industry and there are irregularities on some products, particularly sheets. While merchant bars are holding steady, reinforcing bars are weak. A round lot of the latter recently placed for a local job is understood to have brought out a price equivalent to less than 1.40c., Cleveland. Contract customers are paying 1.60c., Pittsburgh, for structural shapes and plates, although round lots of the former for specific jobs have gone at 1.50c. Plates are generally bringing 1.60c. for current orders. Concessions on auto body and on some other grades of sheets have become more common. Producers are still holding out for the $1 a ton advance on hot-rolled strip for the first quarter. Forging billets have sold at a concession of $3 a ton for specific work. An advance of $2 a ton is announced on wire rods for the first quarter.

### Pig Iron

Business is holding to about recent volume. A Lake furnace interest sold about 400 tons of foundry and malleable iron during the week, mostly in small lots for early delivery. Very little business was placed in this immediate territory. Orders for pig iron from the motor car industry show no increase. Automobile manufacturers who buy castings so far have purchased virtually no castings for delivery after Jan. 1, and this hesitancy is holding back purchases of pig iron. While foundry and malleable iron are quoted at $17, Cleveland, this quotation has become nominal and 50c. a ton reduction is looked for. For outside shipment there is a price range of from $15 to $16, the lower price for delivery at distant points requiring the absorption of considerable freight charge.

### Bars, Plates and Shapes

Conversion of three Lake boats into self-unloaders, work that has been awarded to the American Shipbuilding Co., will require about 2500 tons of plates and shapes, most of which have been purchased. Car repair work for the Chesapeake & Ohio Railroad, taking 4000 tons of plates, has not yet been placed. The White Motor Co. has 774 heavy-duty dump trucks for New York City and this order is bringing out some fair orders for various steel products. The State of Ohio will take bids Dec. 18 for highway bridge work, involving $900,000 and requiring considerable steel, mostly in reinforcing bars.

### Wire Products

Price advances on wire products and a new system of quotation, providing various differentials based on shipping classifications, have been announced by leading producers to become effective Jan. 1. Nails are advanced 5c. a keg to $1.95, Cleveland, for car lots under the new schedule. Manufacturers' wire is unchanged at 2.20c.

### Sheets

Consumers are now taking an interest in first quarter contracts. While considerable inquiry for that delivery has come out, much of this evidently is to test prices. Concessions of $2 a ton to 3c., Pittsburgh, on auto body sheets and to 2.85c. on light cold-rolled sheets have been made in several cases for current orders, and there is evidently a corresponding weakness in hot-rolled annealed sheets. The Ford Motor Co. bought a small tonnage during the week and there was a gain in orders from some of the local stamping plants doing automotive work. A little business also came from the steel barrel companies, which had not been in the market recently.

### Strip Steel

With considerable inquiry pending for the first quarter, a deadlock exists between consumers in the automotive field and producers over prices for that delivery. The larger consumers are attempting to force mills to take hot-rolled strip at 1.50c., Pittsburgh, for wide and 1.60c. for narrow, which are still being named for considerable of the current business, but producers are holding out for the $1 a ton advance that they recently announced for the coming quarter. Cold-rolled strip is quiet and unchanged at 2.05c., Cleveland, for current orders, with producers asking 2.15c. for the first quarter. Orders for hot-rolled strip show a slight gain.

### Old Material

A Cleveland mill purchased a small tonnage of No. 1 heavy melting steel during the past week at $8.25 a ton. This is the price this consumer paid for a round lot several weeks ago. Dealers are paying $7.75 for heavy steel scrap to fill this order. A little scrap is being shipped from Cleveland to the Pittsburgh and West Virginia districts, but shipments to the Youngstown district are virtually shut off. Prices are unchanged.

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# Canadian Business Has a Dull Week

TORONTO, Dec. 9.—New business in the Canadian pig iron markets showed sharp contraction during the week. Sales in the Toronto district were negligible, and only small tonnages were booked in Montreal. An order for 100 tons was placed by an Ontario radiator maker, but otherwise orders were in single car lots, and the total for the week was only about 300 tons. Pig iron production is slowly increasing, but output is still under 30,000 tons a month. Prices are unchanged.

### Old Material

While there was a slight flurry in new orders at the beginning of the week, it was of short duration. Steel scrap sales are at a minimum. Iron grades are in fair demand by foundries in Ontario and Quebec. Dealers are picking up machinery cast for direct shipment to consumers, but otherwise are out of the market. Price lists are unchanged.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, has received a $375,000 order for switching equipment from the Commonwealth Edison Co. for use in the latter company's new Humboldt Park Station in Chicago.

# Eastern Pennsylvania Steel Buying at Low Level

## Some Consuming Plants to Shut Down in Latter Part of Month—Ferromanganese Price Announced

PHILADELPHIA, Dec. 8.—With steel and pig iron consumers holding inventories at a minimum for the year end, buying is generally of small lots. Operating rates of both producers and consumers are low and steel production continues at about 20 per cent of capacity. Some small foundries and metal consuming plants expect to suspend operations completely soon after the middle of the month and will resume after Jan. 1.

Steel prices are generally unchanged except for a trend in plate quotations toward 1.65c., f.o.b. Coatesville, Pa., on all but the smallest business. Domestic makers of ferromanganese have announced 1932 prices.

Two railroad car transports for Seatrain Lines, Inc., requiring about 8000 tons of plates and shapes, have been awarded to the Sun Shipbuilding & Dry Dock Co., Chester, and are expected to be complete for launching in 10 months. Ten fast freight locomotives have been placed with the American Locomotive Co. by the Delaware, Lackawanna & Western Railroad. A large diameter fabricated pipe line for a suburb of Philadelphia, on which all bids were rejected some months ago, will be up for bids again.

### Ferromanganese

Domestic makers have announced 1932 prices for 80 per cent ferromanganese as $75 a gross ton for carloads to 999 tons, $73.50 a ton for 1000 to 1999 tons and $72 a ton for 2000 tons or more. This is a reduction in the quantity differential from $2.50 a ton to $1.50 a ton and a decline in the base price for small lots of $10 a ton from the 1931 level. British sellers have announced equivalent delivered prices for next year.

### Pig Iron

Foundry consumers of pig iron are operating at restricted rates and are reducing stocks of pig iron to the lowest possible level. As a result, pig iron buying is almost entirely of carload lots, on which the price is slightly higher than the minimum quotation of $14.75 a ton, furnace, for medium-sized and large tonnages. Foreign pig iron continues to be offered to eastern Pennsylvania consumers, but buying is small. Indian foundry iron, which is used in small lots for mixture purposes, is quoted at $1.50 to $2 a ton above the present domestic delivered price. Dutch foundry iron is offered at $16 to $16.50 a ton for small lots. British low phosphorus iron is being offered at $18 to $18.50 a ton, delivered to consumers in this district, but without much tonnage being placed. Domestic low phosphorus, both copper bearing and copper free, is quoted at about $22 a ton, eastern Pennsylvania furnace. Basic iron continues inactive.

### Steel Bars

Only small orders for steel bars are being placed. The price is unchanged at 1.60c. a lb., Pittsburgh, or 1.89c., Philadelphia. Billet steel reinforcing bars are subject to concessions of $2 a ton and more for medium-sized projects, the quoted price applying as a rule to well under a carload.

### Shapes and Plates

One shape mill in this district is operating its rolling mill only and may not resume open-hearth operations until the end of the month. Shape prices are irregular, depending upon the tonnage involved. On ordinary business the range is from 1.60c. to 1.65c., f.o.b. nearest mill to consumer, or 1.64½ to 1.69½c., Philadelphia. On lots of a few tons of plates, which make up most of the present buying, 1.70c., Coatesville, Pa., or 1.78½c., Philadelphia, is still being quoted. On more desirable business, ranging up to a carload or more, 1.65c., Coatesville, Pa., or 1.73½c., Philadelphia, is becoming more common. About 600 tons of plates will be required in a large diameter pipe line coming up for bids soon in a suburb of Philadelphia, and 6000 tons of plates will be bought by the Sun Shipbuilding & Dry Dock Co. for two car transports.

### Sheets

Sellers of galvanized sheets in this district have adopted a firmer attitude on prices, and on recent business there has been no evidence of willingness to depart from the minimum of 2.90c., Pittsburgh, or 3.19c., Philadelphia. Other grades of sheets are quiet. Except for some recent buying by a local automobile body builder, and more business in prospect from this source, sheet metal consumers are taking little steel.

### Imports

In the week ended Dec. 5, 1801 tons of chrome ore arrived at this port from Cuba.

### Old Material

A consumer of No. 1 heavy melting steel at Bethlehem has been able to buy upward of 1000 tons recently at $7.25 a ton, delivered. Shipments of this grade to the user at Coatesville, Pa., and of No. 2 steel to Conshohocken, Pa., are limited to a few carloads a week. Other grades are quiet, and in certain cases there is no market among eastern Pennsylvania consumers for the grades offered.

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# Cincinnati Pig Iron Buyers Are Restricting Orders as Inventory Period Approaches

CINCINNATI, Dec. 8.—Approach of the holiday and inventory period is reflected in buyers' conservatism. Purchases the past week totaled slightly more than 1000 tons, of which 400 tons of Northern foundry iron was placed by an Ohio melter. Interest in future requirements is negligible. The only sizable inquiry is from an Indiana melter for 300 tons of Northern foundry iron for first quarter. Prices are unchanged.

### Coke

Interest in next year's requirements has virtually disappeared. By-product coke prices continue firm at about $9, delivered in Cincinnati.

### Finished Steel

Bookings of small quantities of sheets improved a trifle the past week, bringing the demand closer to 40 per cent of capacity output. Automotive demand is quiet, although orders for small lots for preliminary work on new models continue in fair number.

### Old Material

Nearness of inventories is reflected in a dull scrap market. Small quantities of scrap are moving on contract to one or two mills, but others are restricting shipments. The Norfolk & Western Railroad and the Southern Railway are offering lists.

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# Detroit Scrap Market Sluggish but Steady

DETROIT, Dec. 8.—The local scrap market is sluggish, with consumers showing slight interest. Dealers believe that the present dearth of buying will continue the rest of the month, especially with the year-end inventory period so near at hand. Prices are steady and unchanged.

# New York District Steel Orders Decline; Some Prices Weak

## Announcements of First Quarter Quotations Are Generally Being Withheld—Contracting Interest Is Lacking

NEW YORK, Dec. 8.—Steel companies' sales offices here are still awaiting word on first quarter prices on most products. Aside from an advance on merchant wire products and wire rods, there have been no general announcements of quotations for the first three months of 1932. Part of this delay may be due to the weakness that has occurred in certain products and part to the lack of interest among consumers in first quarter contracts. There are a few exceptions. For example, the Standard Oil Co. of New Jersey has now inquired for various forms of steel for delivery at all points during the first half or all of 1932. Most companies quoted for first quarter only.

Weakness in structural shapes and plates has caused many buyers of bars to inquire as to bar prices for current delivery, but thus far, at least, the mills have held firmly to 1.60c., Pittsburgh, on merchant bars, though weakness continues in reinforcing bars, some of which is owing to foreign competition. Imported bars are being offered at 1.35c. a lb., duty paid, in this market. Structural shapes and plates are generally available from Eastern mills at 1.65c., f.o.b. mill, on the more attractive lots, though 1.70c. is being obtained on the ordinary run of small lots. Fabricated structural steel projects of size are estimated frequently on the basis of 1.60c., Bethlehem, for the plain material.

Although local steel sales offices have a little more tonnage on which to figure, the volume of orders for delivery this month has declined. About 900 tons of plates will be required for truck bodies for the City of New York. The White Co., Cleveland, was low on 774 chassis, and the Autocar Co., Ardmore, Pa., was low on 108 chassis for street flushers. A New York shop probably will build the bodies.

### Pig Iron

General inquiry for pig iron continues to be at a minimum. Several district melters, however, are negotiating quietly for their first quarter requirements, with one buyer specifying 1500 tons and two others expected to close on a total of 600 tons. Total sales for the week amounted to 3000 tons, compared with 4500 tons the previous week and 3500 tons two weeks ago.

Foundry operations have already begun to taper off in anticipation of the coming holiday period, and, with recession in melts, shipments are expected to reach a low point toward the latter part of the month.

In view of the generally apathetic state that is expected to prevail during the remainder of the year, no change in the price situation is in prospect. Competition on all business is severe, with eastern Pennsylvania, Buffalo and Royal Dutch irons being offered at practically the same delivered prices.

### Reinforcing Bars

Although prices for normal lots continue to be quoted at 1.60c., Pittsburgh, or 1.93c., delivered New York, concessions of $1 to $2 a ton have been made on attractive tonnages. A State hospital in Brooklyn will take an estimated tonnage of 400 tons of bars, and a teachers' training school at New Paltz, N. Y., will require about 100 tons. Igoe Brothers, Newark, N. J., received contracts covering 350 tons for Lever Brothers plant at Edgewater, N. J., and 300 tons for the non-commissioned officers' quarters at Fort Jay, Governor's Island, N. Y.

### Cast Iron Pipe

Current interest in pressure pipe is restricted to small lots. Future prospects, however, are favorable, with specifications on several proposed public works projects expected to be issued shortly. Awards for the week included about 600 tons of 4 and 6-in., for Public Service Corpn. of N. J., which was divided between Warren Foundry & Pipe Corpn. and United States Pipe & Foundry Co., and 450 tons of Class A pipe for a New Rochelle, N. Y., sewer project, to Donaldson Iron Works. Prices on normal lots are held to schedules, but sizable quantities continue to command concessions of $1 to $2 a ton.

### Old Material

Except for purchases of occasional carloads of No. 1 heavy melting steel for Coatesville, Pa., at $7.75 to $8 a ton, delivered, and continued loading of this grade on barges in New York harbor at $5.50 a ton, the market is quiet. There is no eastern Pennsylvania market at present for machine shop turnings, cast borings or No. 1 blast furnace scrap. A few shipments of these grades have gone to users in the Pittsburgh district, and for this delivery $1.75 a ton, New York, has been paid. Stove plate for delivery to foundries in the New York district brings $4.75 a ton, New York, when it is shipped to a user at West Mahwah, N. J., and $5.25 a ton, delivered to a Bayonne, N. J., plant.

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# Pacific Coast Orders Largely in Cast Iron Pipe; Mill Prices of Plates Are Definitely Lower

SAN FRANCISCO, Dec. 7.—The tonnage of cast iron pipe, on which bids were opened or contracts let, far exceeded the reported awards of finished steel during the past week. The latter totaled only 1500 tons, while the former accounted for nearly 3500 tons. Slightly over 3000 tons of steel is required for new projects.

Following weeks of soft tendencies, mill prices on plates, c.i.f. Pacific ports, are now openly quoted at 1.80c. to 1.85c., a decline of $1 a ton. Other schedules and prices are fairly firm, with no large quantities to afford a test. Fabricating plants are barely keeping skeleton crews employed. A growing number of post office projects are maturing and will be bid on, or the steel placed, during the coming month.

### Finished Steel

Less than 1000 tons of fabricated structural steel was let, with new inquiries for 1600 tons. Only 200 tons of plates were placed, with little more in prospect. Bars were equally quiet, with little over 200 tons placed and 1300 tons embraced in new calls for bids.

### Cast Iron Pipe

For Oakland, American Cast Iron Pipe Co. was low on 800 tons of 6 and 8-in., and National Cast Iron Pipe Co. was low on 220 tons of 4-in. For Pasadena, United States Cast Iron Pipe Co. was low with a bid of $44,786 on 1950 tons of 6 to 16-in. Class B pipe. Signal Hill, Cal., will soon call for bids on four miles of 16 and 20-in., and Long Beach is opening bids on 1100 tons of 24-in.

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Automatic Screw Machine Products Co., Chicago, has been licensed by the Dardelet Threadlock Corpn. to manufacture nuts and screw machine products threaded with the Dardelet self-locking screw thread.

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Ajax Flexible Coupling Co., Westfield, N. Y., has received an order for more than 800 flexible couplings, all to be used on the conveyor drives to be installed in the new Chicago Post Office.

# Birmingham Steel Business Is Fairly Steady but Pig Iron Buying Is in Small Volume

BIRMINGHAM, Dec. 9.—The early part of December has seen a further slowing up in pig iron demand, and this is expected to become more marked over the holiday period. Buying during the past several weeks has been very small; shipments also have declined. All three merchant producers in the district report that the market holds very little of immediate promise. No interest, beyond a few casual inquiries, has been manifested in first quarter tonnage. Quotations for district deliveries remain on a $12 base. Furnace operations are the same as for the past two months, six furnaces being in blast, five of which are on foundry iron and one on basic.

### Finished Steel

Bookings of routine business have maintained a rather steady trend for some weeks past. Prices on bars, plates, shapes and sheets are unchanged. Nails and common wire products are up $1 a ton. The new base on nails, in carloads, f.o.b. Birmingham, is $2.10 a keg. Differentials and new classifications are being strictly observed.

### Bars

Structural steel and reinforcing bar fabricators report only a small amount of new business. The Birmingham plant of the Virginia Bridge & Iron started fabrication last week of 3200 tons for the Louisville & Nashville Railroad bridge at Danville, Tenn. This order was reported as placed several months ago. There has been a decided improvement in the amount of prospective structural steel tonnage, and local plants are hoping for some of this business shortly after the beginning of the new year.

Open-hearth operations last week consisted of six at the Fairfield plant of the Tennessee company and three at the Alabama City plant of the Gulf States Steel Co. During the present week the open-hearth plant of Gulf States Steel will not be operated. It was also down week before last.

### Cast Iron Pipe

No important awards were made last week to Birmingham plants. Pasadena, Cal., opened bids on around 1900 tons and Oakland on 1000 tons, but awards are still pending. Long Beach, Cal., is to open bids this week on about 1000 tons. A limited amount of new business in small lots continues from week to week. Plant operations still average around 30 per cent. Base prices are the same —$32 to $33.

### Old Material

Sales continue light, and there is practically no interest in the market. A sale of 550 tons of heavy melting steel to a foundry was made last week. Contract shipments are slow. Prices are unchanged.

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# Buffalo Market Quiet; Steel Operations Lower

BUFFALO, Dec. 9.—The pig iron situation is quieter than it has been at any time this year. Not more than 2000 or 2500 tons was booked during the week. Foundry operation is about 25 per cent

### Finished Steel

The Lackawanna plant of Bethlehem Steel began the week with eight open-hearths in operation, but indications were that this schedule might be cut during the week. The Republic plant is idle this week. Wickwire Spencer is operating two open-hearths. The Seneca Iron & Steel Co. is operating at about 40 per cent and Buffalo Bolt Co. at 25 to 30 per cent.

Another cell block for the Attica State Prison will require 500 to 600 tons of fabricated structural steel and 800 to 900 tons of reinforcing bars. Warehouse business has been much better so far in December than the corresponding period in November. A change in the warehouse sheet differential in connection with new freight rates is foreseen for next week.

### Old Material

The principal consumer of scrap in this territory is having no difficulty in obtaining No. 1 heavy melting steel at $8.50 and No. 2 heavy melting steel at $7. One purchase made during the past week amounted to 500 tons and another 500 to 1000 tons. This consumer has now accumulated a stock pile of nearly 150,000 tons in the face of very low operations. Another concern, which has been accepting No. 2 melting steel, suspended incoming shipments last week.

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# Reinforcing Steel

## Awards 1800 Tons—New Projects 5830 Tons

**Yonkers, N. Y.,** 215 tons, sterilization plant for Westchester County Sanitary Sewer Commission, to Kalman Steel Corpn.

**Governor's Island, N. Y.,** 300 tons, Fort Jay non-commissioned officers' quarters, to Igoe Brothers, Newark, N. J.

**Edgewater, N. J.,** 350 tons, Lever Brothers plant, to Igoe Brothers, Newark, N. J.

**Monmouth Junction, N. J.,** 300 tons, County road work, to Taylor-Davis Co., Philadelphia; John Lafferty, general contractor.

**Troy, N. Y.,** 225 tons, highway bridge, to Albany Iron & Steel Co.

**Springfield, Ill.,** 200 tons, State bridge work, to Calumet Steel Co.

**Port Angeles, Wash.,** 100 tons, post office, to an unnamed bidder.

**Los Angeles,** 100 tons, Mississippi Avenue Hospital additional tonnage, to Soule Steel Co.

### NEW REINFORCING BAR PROJECTS

**New Paltz, N. Y.,** 100 tons, teachers' training school.

**Brooklyn,** 400 tons, State hospital.

**New York,** 800 tons, West Side elevated highway, Twenty-second Street to Thirty-eighth Street; previously reported 500 tons.

**Attica, N. Y.,** 800 to 900 tons, new cell block for State prison.

**Washington,** 140 tons, two incinerator plants; bids opened Dec. 8 by District Commissioners.

**Springfield, Mo.,** 725 tons, United States hospital for delinquent defectives, J. A. Holpuch Co., low bidder on general contract.

**Biloxi, Miss.,** 565 tons, Federal Soldiers' Home.

**State of Missouri,** 1500 tons, highway projects; bids opened Dec. 3.

**Los Angeles,** 100 tons, Virgil high school.

**Medford, Ore.,** 163 tons, court house.

**Martinez, Cal.,** 100 tons, Hall of Records.

**Stockton, Cal.,** 136 tons, post office.

**Sacramento, Cal.,** 700 tons, filtration plant.

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# Railroad Equipment

**Alaska Railroad** is taking bids on 10 Hart convertible 50-ton ballast cars.

**Fonda, Johnstown & Gloversville** has ordered three Mack, model BG, motor coach chassis.

**Delaware, Lackawanna & Western** has placed orders for 10 Pocono fast freight locomotives with American Locomotive Co. This railroad plans to build six switching locomotives in its Scranton, Pa., shops.

**Lehigh Navigation Coal Co.** is inquiring for one spreader car.

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# Pipe Lines

**Reuben and Gordon Willis,** Chanute, Kan., and associates will build pipe line from Chanute to natural gas fields, about eight and one-half miles. Cost $25,000.

**Texas-Empire Pipe Line Co.,** 2591 North McGregor Street, Houston, Tex., Burt E. Hull, president, plans 12-in. oil pipe line from point near Lima, Seminole County, to east Texas oilfield district.

**City Council,** Santa Cruz, Cal., is considering pipe line extension of municipal water system to Soquel district, about 18,000 ft. of 14-in. pipe, with facilities for daily capacity of 1,000,000 gal. Roy Fowler, city engineer.

**Department of Public Affairs,** City Hall, Newark, N. J., Jerome T. Congleton, director, asks bids until Dec. 14 for steel water pipe line, 2750 ft., with alternate bids for 44-in. riveted steel pipe, 42-in. lock-bar steel pipe, 42-in. hammerwelded steel pipe.

**United Gas Public Service Co.,** Longview, Tex., authorized construction of 4-in. welded steel pipe line for natural gas service in vicinity of Longview, Gladewater and other points, about 30 miles. Cost $150,000.

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Production of iron and steel and their manufactures in Canada in 1930 was valued at $581,017,984, according to preliminary figures compiled by the Dominion Bureau of Statistics, Ottawa, Ont. This total includes $26,055,783 for the bridge building industry which has been included in the iron and steel group for the first time; excluding this industry, the total was 25 per cent below the corresponding figure for 1929 but was only 9 per cent below 1928 and exceeded the output value in any other year since 1920.

# Zinc Price Up in Quiet Metal Market; Copper Sold Through First Half

NEW YORK, Dec. 8.—Only a small volume of domestic or export business was transacted in electrolytic copper in the past week. Consumers of copper as well as other metals are influenced by the usual year-end lull in business. Most of the present copper buying is for forward delivery, and, with many users covered for first quarter at present operating rates, the trend of sales recently has been well into the second quarter of next year. Custom smelters are generally accepting forward business at 6.50c. a lb., delivered Connecticut Valley, but primary producers are unwilling to quote under 6.75c. a lb., delivered, which is in line with the export price of 7c., delivered usual European ports, quoted by Copper Exporters, Inc. Lake copper is quiet at 7.87½c., delivered, for the higher grade and 6.75c. for the lower grade.

Foreign demand for copper has been small; so far this month export sales total only about 2700 tons, well under the weekly average in November. Discussions of changes to be made in methods of handling export business by Copper Exporters, Inc., are continuing. Meanwhile, the American copper producing interest, which withdrew on Nov. 25, effective in 30 days, has indicated no change in its decision.

### Tin

Domestic buying is largely by consumers who are averaging down their costs of tin supplies as the current market declines. While the London tin market is steady and firm, the trend here has been slightly downward, following rapid decline of the pound sterling. From 21c. a. lb., New York, on Dec. 2, the price has settled to 20.65. today. London quotations today are £138 5s. a ton for spot standard, £141 2s. 6d. for future standard, £141 for spot Straits and £143 12s. 6d. for shipment from Singapore. Estimates of tin shipments from the East for this month place the total at 5500 tons, which is somewhat in excess of the actual shipments in November, but last month's total was unusually low. United Kingdom stocks are 30,400 tons, a decline of 110 tons from those of the previous week.

### Zinc

Although statistics for November show a decline in shipments to 29,327 tons, the month's output was 20,526 tons, compared with 21,674 tons in October. Stocks increased 199 tons during the month to 130,865 tons. In the past week, the price of zinc has advanced, having been increased 2½ points to 3.15c. a lb., East St. Louis, and 3.50c., New York, on Dec. 4, and to 3.17½c., East St. Louis, and 3.52½c., New York, on Dec. 7. This upward trend of the price is attributed to curtailment of ore output last week to 3500 tons, while shipments of ore totaled about 4000 tons. Further curtailment by ore producers is expected over the approaching holiday period.

### Lead

Buying continues in fair volume, with consumers covering requirements through January in addition to some prompt shipment business. Prices have been steady through the week at 3.65c. a. lb., St. Louis, and 3.85c., New York.

### Antimony

Quotations for both Chinese and domestic antimony have settled to a level of 6.25c. a lb., duty paid, New York, for prompt shipment, with future delivery at 5.95c. to 6c., duty paid. Much of this weakness in the price is attributed to arrival in the United States during November of 775 tons from China, and generally small demand from consumers here.

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Progress of safety activities in the Lake Superior iron mining region is the subject of three reports by F. S. Crawford, district engineer, recently published by the United States Bureau of Mines, Department of Commerce. Copies may be obtained without charge from the United States Bureau of Mines, Washington.

### The Week's Prices. Cents Per Pound for Early Delivery

| | Dec. 8 | Dec. 7 | Dec. 5 | Dec. 4 | Dec. 3 | Dec. 2 |
|---|---|---|---|---|---|---|
| Lake copper, New York | 6.87½ | 6.87½ | 6.87½ | 6.87½ | 6.87½ | 6.87½ |
| Electrolytic copper, N. Y.* | 6.25 | 6.25 | 6.25 | 6.25 | 6.25 | 6.25 |
| Straits tin, spot, N. Y. | 20.65 | 20.62½ | ... | 20.75 | 20.87½ | 21.00 |
| Zinc, East St. Louis | 3.17½ | 3.17½ | 3.15 | 3.15 | 3.12½ | 3.12½ |
| Zinc, New York | 3.52½ | 3.52½ | 3.50 | 3.50 | 3.47½ | 3.47½ |
| Lead, St. Louis | 3.65 | 3.65 | 3.65 | 3.65 | 3.65 | 3.65 |
| Lead, New York | 3.85 | 3.85 | 3.85 | 3.85 | 3.85 | 3.85 |

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.25c. a lb., New York.

#### From New York Warehouse

*Delivered Prices, Base per Lb.*

| | |
|---|---|
| Tin, Straits pig | 23.00c. to 24.00c. |
| Tin, bar | 25.00c. to 27.00c. |
| Copper, Lake | 8.00c. to 9.00c. |
| Copper, electrolytic | 7.75c. to 8.75c. |
| Copper, casting | 7.50c. to 8.50c. |
| *Copper sheets, hot-rolled | 15.87½c. |
| *High brass sheets | 12.87½c. |
| *Seamless brass tubes | 16.12½c. |
| *Seamless copper tubes | 15.37½c. |
| *Brass rods | 10.62½c. |
| *Brazed brass tubes | 21.62½c. |
| Zinc, slab | 4.75c. to 5.25c. |
| Zinc sheets (No. 9), casks | 9.25c. to 9.50c. |
| Lead, American pig | 4.75c. to 5.00c. |
| Lead, bar | 6.50c. to 7.50c. |
| Lead sheets | 8.25c. |
| Antimony, Asiatic | 9.00c. to 10.00c. |
| Alum., virgin, 99 per cent plus | 23.30c. |
| Alum. No. 1 for remelting, 98 to 99 per cent | 17.00c. to 18.00c. |
| Solder, ½ and ½ | 15.25c. to 16.25c. |

*These prices are also for delivery from Chicago and Cleveland warehouses.

#### Metals from Cleveland Warehouse

*Delivered Prices per Lb.*

| | |
|---|---|
| Tin, Straits pig | 25.50c. |
| Tin, bar | 27.50c. |
| Copper, Lake | 8.37½c. |
| Copper, electrolytic | 8.37½c |
| Copper, castings | 8.00c. |
| Zinc, slab | 4.75c. to 5.00c. |
| Lead, American pig | 4.50c. to 4.75c. |
| Lead, bar | 7.75c. |
| Antimony, Asiatic | 10.00c. |
| Babbitt metal, medium grade | 15.00c. |
| Babbitt metal, high grade | 29.50c. |
| Solder, ½ and ½ | 18.50c. |

#### Old Metals, Per Lb., New York

*Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)*

| | Dealers' Buying Prices | Dealers' Selling Prices |
|---|---|---|
| Copper, hvy. crucible | 5.25c. | 6.00c. |
| Copper, hvy. and wire | 5.00c. | 5.75c. |
| Copper, light and bottoms | 4.00c. | 4.75c. |
| Brass, heavy | 2.50c. | 3.25c. |
| Brass, light | 2.00c. | 2.75c. |
| Hvy. machine composition | 4.00c. | 4.75c. |
| No. 1 yel. brass turnings | 3.00c. | 3.50c. |
| No. 1 red brass or compos. turnings | 3.50c. | 4.25c. |
| Lead, heavy | 2.75c. | 3.25c. |
| Zinc | 1.25c. | 1.75c. |
| Sheet aluminum | 9.00c. | 11.00c. |
| Cast aluminum | 3.25c. | 5.00c. |

# ▲▲▲ Prices of Finished and Semi-Finished Steel,

## BARS, PLATES, SHAPES

### Iron and Steel Bars

*Soft Steel*

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh mill | 1.60c. |
| F.o.b. Chicago | 1.60c. to 1.70c. |
| Del'd Philadelphia | 1.89c. |
| Del'd New York | 1.93c. |
| F.o.b. Cleveland | 1.65c. |
| F.o.b. Lackawanna | 1.70c. |
| F.o.b. Birmingham | 1.70c. |
| C.i.f. Pacific ports | 2.00c. |

*Billet Steel Reinforcing*

| | |
|---|---|
| F.o.b. P'gh mills, 40, 50, 60-ft. | 1.60c. |
| F.o.b. Birmingham, mill lengths | 1.75c. |
| F.o.b. Cleveland | 1.50c. |

*Rail Steel*

| | |
|---|---|
| F.o.b. mills, east of Chicago dist. | 1.30c. to 1.35c. |
| F.o.b. Chicago Heights mill | 1.50c. to 1.60c. |
| Del'd Philadelphia | 1.49c. to 1.59c. |

*Iron*

| | |
|---|---|
| Common iron, f.o.b. Chicago | 1.60c. to 1.70c. |
| Refined iron, f.o.b. P'gh mills | 2.75c. |
| Common iron, del'd Philadelphia | 2.09c. |
| Common iron, del'd New York | 2.14c. |

### Tank Plates

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh mill | 1.55c. to 1.60c. |
| F.o.b. Chicago | 1.60c. to 1.70c. |
| F.o.b. Birmingham | 1.70c. |
| Del'd Cleveland | 1.78½c. |
| Del'd Philadelphia | 1.73½c. to 1.78½c. |
| F.o.b. Coatesville | 1.65c. to 1.75c. |
| F.o.b. Sparrows Point | 1.65c. to 1.70c. |
| F.o.b. Lackawanna | 1.65c. to 1.70c. |
| Del'd New York | 1.83c. to 1.88c. |
| C.i.f. Pacific ports | 1.80c. to 1.85c. |

### Structural Shapes

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh mill | 1.50c. to 1.60c. |
| F.o.b. Chicago | 1.60c. to 1.70c. |
| F.o.b. Birmingham | 1.70c. |
| F.o.b. Lackawanna | 1.65c. to 1.70c. |
| F.o.b. Bethlehem | 1.65c. to 1.70c. |
| Del'd Cleveland | 1.68½c. to 1.78½c. |
| Del'd Philadelphia | 1.64½c. to 1.69½c. |
| Del'd New York | 1.80¼c. to 1.85¼c. |
| C.i.f. Pacific ports (standard) | 2.05c. |
| C.i.f. Pacific ports (wide flange) | 2.15c. |

### Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

| S.A.E. Series Numbers | | Alloy Differential per 100 Lb. |
|---|---|---|
| 2000 | (1% Nickel) | $0.25 |
| 2100 | (1½% Nickel) | 0.55 |
| 2300 | (3½% Nickel) | 1.50 |
| 2500 | (5% Nickel) | 2.25 |
| 3100 | Nickel Chromium | 0.55 |
| 3200 | Nickel Chromium | 1.35 |
| 3500 | Nickel Chromium | 3.80 |
| 3400 | Nickel Chromium | 3.20 |
| 4100 | Chromium Molybdenum (0.15 to 0.25 Molybdenum) | 0.50 |
| 4100 | Chromium Molybdenum (0.25 to 0.40 Molybdenum) | 0.70 |
| 4600 | Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel) | 1.20 |
| 5100 | Chromium Steel (0.60 to 0.90 Chromium) | 0.35 |
| 5100 | Chromium Steel (0.80 to 1.10 Chromium) | 0.45 |
| 5100 | Chromium Spring Steel | 0.20 |
| 6100 | Chromium Vanadium Bar | 1.25 |
| 6100 | Chromium Vanadium Spring Steel | 0.95 |
| 9250 | Silicon Manganese Spring Steel (flats) | 0.25 |
| | Rounds and squares | 0.50 |
| Chromium Nickel Vanadium | | 1.50 |
| Carbon Vanadium | | 0.95 |

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

### Cold-Finished Bars

| | *Base per Lb.* |
|---|---|
| Bars, f.o.b. Pittsburgh mill | 2.10c. |
| Bars, f.o.b. Chicago | 2.10c. |
| Bars, Cleveland | 2.00c. to 2.10c. |
| Bars, Buffalo | 2.10c. |
| Shafting, ground, f.o.b. mill | *2.45c. to 3.40c. |

## SHEETS, STRIP, TIN PLATE, TERNE PLATE

### Sheets

*Hot-Rolled*

| | *Base per Lb.* |
|---|---|
| No. 10, f.o.b. Pittsburgh | 1.65c. to 1.70c. |
| No. 10, f.o.b. Chicago mills | 1.80c. |
| No. 10, del'd Philadelphia | 1.99c. |
| No. 10, f.o.b. Birmingham | 1.85c. |
| No. 10, c.i.f. Pacific Coast ports | 2.33c. |

*Hot-Rolled and Annealed*

| | |
|---|---|
| No. 10, Pittsburgh | 1.85c. |
| No. 10, Chicago mills | 1.95c. |
| No. 10, Birmingham | 2.00c. |

*Hot-Rolled Annealed*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 2.40c. |
| No. 24, f.o.b. Chicago mills | 2.50c. |
| No. 24, del'd Philadelphia | 2.69c. |
| No. 24, f.o.b. Birmingham | 2.55c. |
| No. 24, c.i.f. Pacific Coast ports | 2.88c. |

*Heavy Cold-Rolled*

| | |
|---|---|
| No. 10 gage, f.o.b. Pittsburgh | 2.35c. |
| No. 10 gage, f.o.b. Chicago mills | 2.45c. |
| No. 10 gage, del'd Philadelphia | 2.64c. |

*Light Cold-Rolled*

| | |
|---|---|
| No. 20 gage, f.o.b. Pittsburgh | 2.85c. to 2.95c. |
| No. 20 gage, f.o.b. Chicago mills | 3.05c. |
| No. 20 gage, del'd Philadelphia | 3.24c. |

*Automobile Body Sheets*

| | |
|---|---|
| No. 20, f.o.b. Pittsburgh | 3.00c. to 3.10c. |

*Steel Furniture Sheets*

| | |
|---|---|
| No. 10, f.o.b. Pittsburgh | 2.75c. |
| No. 20, f.o.b. Pittsburgh | 3.35c. |

(Prices on furniture stock include stretcher leveling but not resquaring.)

*Galvanized Sheets*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 2.90c. |
| No. 24, f.o.b. Chicago mills | 3.00c. |
| No. 24, del'd Philadelphia | 3.19c. |
| No. 24, f.o.b. Birmingham | 3.05c. |
| No. 24, c.i.f. Pacific Coast ports | 3.38c. |

*Long Ternes*

| | |
|---|---|
| No. 24, unassorted, 8-lb. coating, f.o.b. P'gh | 3.05c. to 3.15c. |

*Vitreous Enameling Stock*

| | |
|---|---|
| No. 10, f.o.b. Pittsburgh | 2.75c. |
| No. 20, f.o.b. Pittsburgh | 3.25c. |

*Tin Mill Black Plate*

| | |
|---|---|
| No. 28, f.o.b. Pittsburgh | 2.65c. |
| No. 28, Chicago mills | 2.75c. |

### Tin Plate

| | *Base per Box* |
|---|---|
| Standard cokes, f.o.b. P'gh district mills | $4.75 |
| Standard cokes, f.o.b. Gary | 4.85 |

### Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

| | |
|---|---|
| 8-lb. coating I.C. $9.50 | 25-lb. coating I.C. $14.10 |
| 15-lb. coating I.C. 12.00 | 30-lb. coating I.C. 14.90 |
| 20-lb. coating I.C. 13.00 | 40-lb. coating I.C. 16.70 |

### Hot-Rolled Hoops, Bands and Strips

| | *Base per Lb.* |
|---|---|
| 6 in. and narrower, Pittsburgh | 1.60c. to 1.65c. |
| Wider than 6 in., P'gh | 1.50c. to 1.55c. |
| 6 in. and narrower, Chicago | 1.70c. to 1.75c. |
| Wider than 6 in., Chicago | 1.60c. to 1.65c. |
| Cooperage stock, P'gh | 1.75c. to 1.85c. |
| Cooperage stock, Chicago | 1.85c. to 1.95c. |

### Cold-Rolled Strips

| | |
|---|---|
| F.o.b. P'gh | 2.05c. to 2.15c. |
| F.o.b. Cleveland | 2.05c. |
| F.o.b. del'd Chicago | 2.33c. |
| F.o.b. Worcester | 2.20c. |
| Fender stock, No. 20 gage, Pittsburgh or Cleveland | 3.00c. to 3.10c. |

*According to size.

## STEEL PIPE AND TUBING

### Welded Pipe

**Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills**

*Butt Weld*

| *Steel* Inches | Black | Galv. | *Iron* Inches | Black | Galv. |
|---|---|---|---|---|---|
| ⅛ | 47 | 21½ | ¼ and ⅜ | +11 | +36 |
| ¼ to ⅜ | 53 | 27½ | ½ | 23 | 5 |
| ½ | 58 | 44½ | ¾ | 28 | 11 |
| ¾ | 62 | 50½ | 1 and 1¼ | 31 | 15 |
| 1 to 3 | 64 | 52½ | 1½ and 2 | 35 | 18 |

*Lap Weld*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 57 | 45½ | 2 | 28 | 9 |
| 2½ to 6 | 61 | 49½ | 2½ to 3½ | 28 | 13 |
| 7 and 8 | 58 | 45½ | 4 to 6 | 30 | 15 |
| 9 and 10 | 56 | 43½ | 7 and 8 | 29 | 16 |
| 11 and 12 | 55 | 42½ | 9 to 12 | 26 | 11 |

*Butt Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| ⅛ | 43 | 26½ | ¼ and ⅜ | +13 | +18 |
| ¼ to ⅜ | 49 | 32½ | ½ | 23 | 7 |
| ½ | 55 | 44½ | ¾ | 28 | 12 |
| ¾ | 60 | 49½ | 1 to 2 | 34 | 18 |
| 1 to 1½ | 62 | 51½ | | | |
| 2 to 3 | 63 | 52½ | | | |

*Lap Welds, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 55 | 44½ | 2 | 29 | 13 |
| 2½ to 4 | 59 | 48½ | 2½ to 4 | 34 | 20 |
| 4½ to 6 | 58 | 47½ | 4½ to 6 | 33 | 19 |
| 7 to 8 | 54 | 44½ | 7 and 8 | 31 | 17 |
| 9 and 10 | 47 | 34½ | 9 to 12 | 21 | 8 |
| 11 and 12 | 46 | 33½ | | | |

On extras the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

### Boiler Tubes

**Base Discounts, f.o.b. Pittsburgh**

| *Steel* | | *Charcoal Iron* | |
|---|---|---|---|
| 2 in. and 2¼ in. | 38 | 1½ in. | 1 |
| 2½ in. to 2¾ in. | 46 | 1¾ in. | 8 |
| 3 in. | 52 | 2 in. to 2¼ in. | 13 |
| 3¼ in. to 3¾ in. | 54 | 2½ in. to 2¾ in. | 16 |
| 4 in. | 57 | 3 in. | 17 |
| 4½ in. to 6 in. | 46 | 3¼ in. to 3½ in. | 18 |
| | | 4 in. | 20 |
| | | 4½ in. | 21 |

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

*Standard Commercial Seamless Boiler Tubes*

*Cold Drawn*

| | | | |
|---|---|---|---|
| 1 in. | 61 | 3 in. | 46 |
| 1¼ to 1½ in. | 53 | 3¼ to 3½ in. | 48 |
| 1¾ in. | 37 | 4 in. | 51 |
| 2 to 2¼ in. | 32 | 4½, 5 and 6 in. | 40 |
| 2½ to 2¾ in. | 40 | | |

*Hot Rolled*

| | | | |
|---|---|---|---|
| 2 and 2¼ in. | 38 | 3¼ to 3½ in. | 54 |
| 2½ and 2¾ in. | 46 | 4 in. | 57 |
| 3 in. | 52 | 4½, 5 and 6 in. | 46 |

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

### Seamless Mechanical Tubing

| | *Per Cent Off List* |
|---|---|
| Carbon, 0.10% to 0.30% base (carloads) | 55 |
| Carbon, 0.30% to 0.40% base | 50 |

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

# Bolts, Nuts, Coke, Coal, Fuel Oil, Cast Iron Pipe

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

*To Manufacturing Trade*

| | |
|---|---|
| Bright wire | 2.20c. |
| Spring wire | 3.20c. |

*To Jobbing Trade*

| | *Base per Keg* |
|---|---|
| Standard wire nails | $1.90 to $1.95 |
| Smooth coated nails | 1.90 to 1.95 |
| Galvanized nails | 3.90 |

| | *Base per Lb.* |
|---|---|
| Smooth annealed wire | 2.35c. |
| Smooth galvanized wire | 2.80c. |
| Polished staples | 2.35c. to 2.50c. |
| Galvanized staples | 2.60c. to 2.75c. |
| Barbed wire, galvanized | 2.55c. to 2.60c. |

| | |
|---|---|
| Woven wire fence, Nos. 9 and 11 gage, per net ton | $55.00 |
| Woven wire fence, No. 12½ gage and lighter, per net ton | 60.00 |

*Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.*

## RAILS AND TRACK SUPPLIES

### Rails

| | *Per Gross Ton* |
|---|---|
| Standard, f.o.b. mill | $43.00 |
| Light (from billets), f.o.b. mill | 34.00 |
| Light (from rail steel), f.o.b. mill | 32.00 |

### Track Equipment

| | *Base per 100 Lb.* |
|---|---|
| Spikes, ⅜-in. and larger | $2.70 |
| Spikes, ½ in. and larger | 2.70 |
| Spikes, boat and barge | 2.90 |
| Tie plate, steel | 1.85 |
| Angle bars | 2.75 |
| Track bolts, to steam railroads | $3.80 to 4.00 |
| Track bolts, to jobbers, all sizes, per 100 count | 73 per cent off list |

## BOLTS, NUTS, RIVETS AND SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

| | *Per Cent Off List* |
|---|---|
| †Machine bolts | 73, 10 and 10 |
| †Carriage bolts | 73, 10 and 10 |
| Lag bolts | 73, 10 and 10 |
| Plow bolts, Nos. 1, 2, 3 and 7 heads | 73, 10 and 10 |
| Hot-pressed nuts, blank or tapped, square | 73, 10 and 10 |
| Hot-pressed nuts, blank or tapped, hexagons | 73, 10 and 10 |
| C.p.c. and t. square or hex. nuts, blank or tapped | 73, 10 and 10 |
| Washers* | 7.00c. to 6.75c. per lb. off list |

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

### Bolts and Nuts

| | *Per Cent Off List* |
|---|---|
| Semi-finished hexagons nuts | 73, 10 and 10 |
| Semi-finished hexagons castellated nuts, S.A.E. | 73, 10 and 10 |
| Stove bolts in packages, P'gh | 80, 25 and 10 |
| Stove bolts in packages, Ch'go | 80, 25 and 10 |
| Stove bolts in pkgs., Cleveland | 80, 25 and 10 |
| Stove bolts in bulk, P'gh | 80, 25, 10 and 2½ |
| Stove bolts in bulk, Ch'go | 80, 25, 10 and 2½ |
| Stove bolts, in bulk, Cleveland | 80, 25, 10 and 2½ |
| Tire bolts | 60, 10 and 10 |

Discounts of 73, 10 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

### Large Rivets

(½-in. and larger)

| | *Base per 100 Lb.* |
|---|---|
| F.o.b. Pittsburgh or Cleveland | 2.25 |
| F.o.b. Chicago | 2.35 |

### Small Rivets

(½-in. and smaller)

| | *Per Cent Off List* |
|---|---|
| F.o.b. Pittsburgh | 70, 10 and 5 |
| F.o.b. Cleveland | 70, 10 and 5 |
| F.o.b. Chicago | 70, 10 and 5 |

### Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

| | *Per Cent Off List* |
|---|---|
| Milled cap screws | 80, 10, 10 and 5 |
| Milled standard set screws, case hardened | 80 and 5 |
| Milled headless set screws, cut thread | 75 and 10 |
| Upset hex. head cap screws, U.S.S.S. thread | 85 and 10 |
| Upset hex. cap screws, S.A.E. thread | 85 and 10 |
| Upset set screws | 80, 10 and 5 |
| Milled studs | 70 |

## SEMI-FINISHED STEEL

### Billets and Blooms

| | *Per Gross Ton* |
|---|---|
| Rerolling, 4-in. and under 10-in., Pittsburgh | $29.00 |
| Rerolling, 4-in. and under 10-in., Youngstown | 29.00 |
| Rerolling, 4-in. and under 10-in., Cleveland | 29.00 |
| Rerolling, 4-in. and under 10-in., Chicago | 31.00 |
| Forging quality, Pittsburgh | 35.00 |

### Sheet Bars

(Open-Hearth or Bessemer)

| | *Per Gross Ton* |
|---|---|
| Pittsburgh | $29.00 |
| Youngstown | 29.00 |
| Cleveland | 29.00 |

### Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

| | *Per Gross Ton* |
|---|---|
| Pittsburgh | $29.00 |
| Youngstown | 29.00 |
| Cleveland | 29.00 |

### Skelp

(F.o.b. Pittsburgh or Youngstown)

| | *Per Lb.* |
|---|---|
| Grooved | 1.60c. |
| Universal | 1.60c. |
| Sheared | 1.60c. |

### Wire Rods

(Common soft, base)

| | *Per Gross Ton* |
|---|---|
| Pittsburgh | $35.00 to $37.00 |
| Cleveland | 35.00 to 37.00 |
| Chicago | 36.00 to 38.00 |

## COKE, COAL AND FUEL OIL

### Coke

| | *Per Net Ton* |
|---|---|
| Furnace, f.o.b. Connellsville prompt | $2.40 |
| Foundry, f.o.b. Connellsville prompt | $3.25 to 4.50 |
| Foundry, by-product, Ch'go ovens | 7.50 |
| Foundry, by-product, New England, del'd | 10.50 |
| Foundry, by-product, Newark or Jersey City, delivered | 8.70 to 9.10 |
| Foundry, by-product, Phila. | $9.00 |
| Foundry, Birmingham | 5.00 |
| Foundry, by-product, St. Louis, f.o.b. ovens | 8.00 |
| Foundry, by-product, del'd St. Louis | 9.00 |

### Coal

| | *Per Net Ton* |
|---|---|
| Mine run steam coal, f.o.b. W. Pa. mines | $1.40 to $1.50 |
| Mine run coking coal, f.o.b. W. Pa. | 1.50 to 1.60 |
| Gas coal, ¾-in., f.o.b. Pa. mines | $1.70 to $1.80 |
| Mine run gas coal, f.o.b. Pa. mines | 1.50 to 1.60 |
| Steam slack, f.o.b. W. Pa. mines | 0.35 to 0.45 |
| Gas slack, f.o.b. W. Pa. mines | 0.55 to 0.75 |

### Fuel Oil

| | *Per Gal. f.o.b. Bayonne, N. J.* |
|---|---|
| No. 3 distillate | 3.50c. |
| No. 4 industrial | 3.00c. |
| | *Per Gal. f.o.b. Baltimore* |
| No. 3 distillate | 3.50c. |
| No. 4 industrial | 3.25c. |

## FLUXES AND REFRACTORIES

### Fluorspar

| | *Per Net Ton* |
|---|---|
| Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines | $13.00 |
| No. 2 lump, Illinois and Kentucky mines | 17.00 |
| Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid | 17.00 |
| Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines | 32.00 |

### Chrome Brick

| | *Per Net Ton* |
|---|---|
| Standard size | $45.00 |

### Fire Clay Brick

| | *Per 1000 f.o.b. Works* | |
|---|---|---|
| | High-Heat Duty Brick | Intermediate Heavy Duty Brick |
| Pennsylvania | $40.00 | $32.00 to $35.00 |
| Maryland | 40.00 | 32.00 to 35.00 |
| New Jersey | $44.00 to 59.00 | ..... |
| Ohio | 40.00 | 32.00 to 35.00 |
| Kentucky | 40.00 | 32.00 to 35.00 |
| Missouri | 37.00 | 32.00 to 35.00 |
| Illinois | 40.00 | 32.00 to 35.00 |
| Ground fire clay, per ton | 6.50 | |

### Silica Brick

| | *Per 1000 f.o.b. Works* |
|---|---|
| Pennsylvania | $40.00 |
| Chicago | 48.00 |
| Birmingham | 50.00 |
| Silica clay, per ton | 8.00 |

### Magnesite Brick

| | *Per Net Ton* |
|---|---|
| Standard sizes, f.o.b. Baltimore and Chester, Pa. | $65.00 |
| Grain magnesite, f.o.b. Baltimore and Chester, Pa. | 40.00 |

## CAST IRON PIPE

| | *Per Net Ton* |
|---|---|
| 6-in. and larger, del'd Chicago | $40.00 to $42.00 |
| 4-in., del'd Chicago | 43.00 to 45.00 |
| 6-in. and larger, del'd New York | $32.90 |
| 4-in., del'd New York | 35.90 |
| 6-in. and larger, Birmingham | $32.00 to 33.00 |
| 4-in., Birmingham | $35.00 to $36.00 |

Class "A" and gas pipe, $3 extra.

# Pig Iron Prices for All Districts

## VALLEY

**Per gross ton, f.o.b. Valley furnace:**

| | |
|---|---|
| Basic | $15.00 |
| Bessemer | 16.50 |
| Gray forge | 15.00 |
| No. 2 foundry | 16.00 |
| No. 3 foundry | 15.50 |
| Malleable | 16.50 |
| Low phos., copper free | $26.66 to 27.00 |

Freight rate to Pittsburgh or Cleveland district, $1.76.

## PITTSBURGH

**Per gross ton, f.o.b. Pittsburgh district furnace:**

| | |
|---|---|
| Basic | $15.50 to $16.00 |
| No. 2 foundry | 17.00 |
| No. 3 foundry | 16.50 |
| Malleable | 17.00 |
| Bessemer | 17.00 |

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

## CHICAGO

**Per gross ton at Chicago furnace:**

| | |
|---|---|
| N'th'n No. 2 fdy. | $17.00 |
| N'th'n No. 1 fdy. | 17.50 |
| Malleable, not over 2.25 sil. | 17.00 |
| High phosphorus | 17.00 |
| Lake Super. charcoal, sil. 1.50 | $23.04 to 25.04 |
| S'th'n No. 2 fdy. | 17.01 |
| Low phos., sil. 1 to 2, copper free | 28.50 to 29.20 |
| Silvery, sil. 8 per cent | 24.79 |
| Bess. ferrosilicon, 14-15% | 31.29 |

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including an average switching charge of 61c. per gross ton.

## ST. LOUIS

**Per gross ton at St. Louis:**

| | |
|---|---|
| No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill. | $17.50 |
| Malleable, f.o.b. Granite City | 17.50 |
| N'th'n No. 2 fdy., del'd St. Louis | 19.16 |
| Southern No. 2 fdy., deliv'd | 15.42 |
| Northern malleable, deliv'd | 19.16 |
| Northern basic, deliv'd | 19.16 |

Freight rates 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

## NEW YORK

**Per gross ton, delivered New York district:**

| | |
|---|---|
| *Buffalo, No. 2, del'd east. N. J. | $17.78 to $18.28 |
| East. Pa. No. 2 fdy. | 16.89 to 17.39 |
| East. Pa. No. 2X fdy. | 17.89 to 18.39 |

Freight rates: $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

## BUFFALO

**Per gross ton, f.o.b. furnace:**

| | |
|---|---|
| No. 2 fdy. | $17.00 |
| No. 2X fdy. | 17.50 |
| No. 1 fdy. | 18.50 |
| Malleable, sil. up to 2.25 | 17.50 |
| Basic | 17.00 |
| Lake Superior charcoal | 25.28 |

## NEW ENGLAND

**Per gross ton delivered to most New England points:**

| | |
|---|---|
| *Buffalo, sil. 1.75 to 2.25 | $19.91 |
| *Buffalo, sil. 2.25 to 2.75 | 19.91 |
| *Ala., sil. 1.75 to 2.25 | $20.11 to 20.61 |
| *Ala., sil. 2.25 to 2.75 | 20.61 to 21.11 |
| †Ala., sil. 1.75 to 2.25 | 16.75 |
| †Ala., sil. 2.25 to 2.75 | 17.25 |

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

## CINCINNATI

**Per gross ton, delivered Cincinnati:**

| | |
|---|---|
| Ala. fdy., sil. 1.75 to 2.25 | $14.69 |
| Ala. fdy., sil. 2.25 to 2.75 | 15.19 |
| Tenn. fdy., sil. 1.75 to 2.25 | 14.69 |
| N'th'n No. 2 foundry | 17.90 |
| S'th'n Ohio silvery, 8 per cent | 21.89 |

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

## PHILADELPHIA

**Per gross ton at Philadelphia:**

| | |
|---|---|
| East. Pa. No. 2 | $15.51 to $16.01 |
| East. Pa. No. 2X | 16.01 to 16.51 |
| East. Pa. No. 1X | 16.51 to 17.01 |
| Basic (del'd east. Pa.) | 16.25 |
| Malleable | 18.50 to 19.00 |
| Stand. low phos. (f.o.b. east. Pa. furnace) | 22.00 to 23.00 |
| Cop. b'r'g low phos. (f.o.b. furnace) | 22.00 to 23.50 |
| Va. No. 2 plain | 22.04 |
| Va. No. 2X | 22.54 |

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

## CLEVELAND

**Per gross ton at Cleveland furnace:**

| | |
|---|---|
| N'th'n No. 2 fdy. (local delivery) | $17.00 |
| S'th'n fdy., sil. 1.75 to 2.25 | 17.01 |
| Malleable (local delivery) | 17.00 |
| Ohio silvery, 8 per cent | 23.00 |
| Stand. low phos., Valley | 27.00 |

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

## BIRMINGHAM

**Per gross ton, f.o.b. Birmingham dist. furnaces:**

| | |
|---|---|
| No. 2 fdy., 1.75 to 2.25 sil. | $12.00 |
| No. 1 fdy., 2.25 to 2.75 sil. | 12.50 |
| Basic | 12.00 |

## CANADA

**Per gross ton:**

Delivered Toronto

| | |
|---|---|
| No. 1 fdy., sil. 2.25 to 2.75 | $22.60 |
| No. 2 fdy., sil. 1.75 to 2.25 | 22.10 |
| Malleable | 22.60 |

Delivered Montreal

| | |
|---|---|
| No. 1 fdy., sil. 2.25 to 2.75 | $24.00 |
| No. 2 fdy., sil. 1.75 to 2.25 | 23.50 |
| Malleable | 24.00 |
| Basic | $23.00 to 23.50 |

# Prices of Ores and Ferroalloys

## Ores

*Lake Superior Ores, Delivered Lower Lake Ports*

| | *Per Gross Ton* |
|---|---|
| Old range Bessemer, 51.50% iron | $4.80 |
| Old range non-Bessemer, 51.50% iron | 4.65 |
| Mesabi Bessemer, 51.50% iron | 4.65 |
| Mesabi non-Bessemer, 51.50% iron | 4.50 |
| High phosphorus, 51.50% iron | 4.40 |

*Foreign Ore, c.i.f. Philadelphia or Baltimore*

| | *Per Unit* |
|---|---|
| Iron, low phos., copper free, 55 to 58% iron, dry, Spanish or Algerian | 8c. to 8.50c. |
| Iron, low phos., Swedish, aver. 68% iron | 9.00c. |
| Iron, basic or foundry, Swedish, average 65% iron | 8.00c. |
| Iron, basic and foundry, Russian, aver. 63% iron (nom.) | 9.00c. |
| Manganese, Caucasian, washed 52% | 24.00c. |
| Manganese, African, Indian, 50-52% | 23c. to 24c. |
| Manganese, Brazilian, 46 to 48% | 22c. to 23c. |
| Tungsten, 60% concentrates | $12.00 to $12.50 |

| | *Per Gross Ton* |
|---|---|
| Chrome, 45% $Cr_2O_3$ crude, c.i.f. Atlantic seaboard | $18.00 |
| Chrome, 48% $Cr_2O_3$, c.i.f. Atlantic seaboard | 20.00 |

## Ferromanganese

| | *Per Gross Ton* |
|---|---|
| Domestic, 80%, seaboard | *$72.00 to $75.00 |
| Foreign, 80%, Atlantic or Gulf port, duty paid | *72.00 to 75.00 |

*Minimum price quoted for lots of 2000 tons or more.

## Spiegeleisen

| | *Per Gross Ton Furnace* |
|---|---|
| Domestic, 19 to 21% | $26.00 to $27.00 |

## Electric Ferrosilicon

| | *Per Gross Ton Delivered* |
|---|---|
| 50% (carloads) | $77.50 |
| 50% (less carload) | 85.00 |
| 75% | 126.00 |

| *Per Gross Ton Furnace* | | *Per Gross Ton Furnace* | |
|---|---|---|---|
| 10% | $35.00 | 12% | $39.00 |
| 11% | 37.00 | 14 to 16% | 31.00 |

## Bessemer Ferrosilicon

**F.o.b. Jackson County, Ohio, Furnace**

| *Per Gross Ton* | | *Per Gross Ton* | |
|---|---|---|---|
| 10% | $22.00 | 13% | $24.50 |
| 11% | 22.50 | 14% | 26.50 |
| 12% | 23.50 | 15% | 28.50 |

## Silvery Iron

**F.o.b. Jackson County, Ohio, Furnace**

| *Per Gross Ton* | | *Per Gross Ton* | |
|---|---|---|---|
| 6% | $19.00 | 11% | $21.50 |
| 7% | 19.50 | 12% | 22.50 |
| 8% | 20.00 | 13% | 23.50 |
| 9% | 20.50 | 14% | 25.50 |
| 10% | 21.00 | 15% | 27.50 |

## Other Ferroalloys

| | |
|---|---|
| Ferrotungsten, per lb. wo. del., carloads | $1.08 |
| Ferrotungsten, less carloads | $1.15 to 1.25 |
| Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads | 10.00c. |
| Ferrochromium, 2% carbon | 17.00c. to 17.50c. |
| Ferrochromium, 1% carbon | 19.00c. to 20.00c. |
| Ferrochromium, 0.10% carbon | 23.50c. to 25.00c. |
| Ferrochromium, 0.06% carbon | 25.50c. to 27.00c. |
| Ferrovanadium, del., per lb. contained Va. | $3.05 to $3.30 |
| Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads | 160.00 |
| Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton | 91.00 |
| Ferromolybdenum, per lb. Mo., del. | 1.00 |
| Calcium molybdate, per lb. Mo., del. | 85c. |
| Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton | $122.50 |
| Silico spiegel, per ton, f.o.b. furnace, car lots | 42.50 |
| Ton lots or less, per ton | 47.50 |
| Silico-manganese, gross ton, delivered: 2.50% carbon grade | 105.00 |
| 1% carbon grade | 115.00 |
| Spot prices | $5 a ton higher |

# Old Material Quotations

## PITTSBURGH

Per gross ton delivered consumers' yards:

| | | |
|---|---|---|
| No. 1 heavy melting steel | $10.00 to | $10.50 |
| No. 2 heavy melting steel | 9.00 to | 9.50 |
| No. 2 railroad wrought | 10.00 to | 10.50 |
| Scrap rails | 10.00 to | 10.50 |
| Rails 3 ft. and under | 12.00 to | 12.50 |
| Sheet bar crops, ordinary | 11.00 to | 11.50 |
| Compressed sheet steel | 9.75 to | 10.00 |
| Hand bundled sheet steel | 9.00 to | 9.50 |
| Hvy. steel axle turnings | 9.25 to | 9.75 |
| Machine shop turnings | 6.75 to | 7.25 |
| Short shov. steel turnings | 6.75 to | 7.25 |
| Short mixed borings and turnings | 6.75 to | 7.25 |
| Cast iron borings | 6.75 to | 7.25 |
| Cast iron carwheels | 10.50 to | 11.00 |
| Heavy breakable cast | 8.00 to | 8.50 |
| No. 1 cast | 9.50 to | 10.50 |
| Railr. knuckles and couplers | 10.50 to | 11.50 |
| Rail. coil and leaf springs | 10.50 to | 11.50 |
| Rolled steel wheels | 10.50 to | 11.50 |
| Low phos. billet crops | 13.00 to | 13.50 |
| Low phos. sheet bar crops | 12.50 to | 13.00 |
| Low phos. plate scrap | 10.00 to | 11.50 |
| Low phos. punchings | 12.50 to | 13.00 |
| Steel car axles | 15.50 to | 16.50 |

## CHICAGO

Delivered Chicago district consumers:

*Per Gross Ton*

| | | |
|---|---|---|
| Heavy melting steel | $7.50 to | $8.00 |
| Shoveling steel | 7.50 to | 8.00 |
| Frogs, switches and guards | 7.75 to | 8.25 |
| Factory hyd. comp. sheets | 6.00 to | 6.50 |
| Drop forge flashings | 5.00 to | 5.50 |
| No. 1 busheling | 5.50 to | 6.00 |
| Rolled carwheels | 8.25 to | 9.25 |
| Railroad tires | 9.00 to | 9.50 |
| Railroad leaf springs | 9.50 to | 10.00 |
| Axle turnings | 6.00 to | 6.50 |
| Steel couplers and knuckles | 8.50 to | 9.00 |
| Coil springs | 9.50 to | 10.00 |
| Axle turnings | 6.00 to | 6.50 |
| Low phos. punchings | 10.00 to | 10.50 |
| Low phos. plates, 12 in. and under | 9.00 to | 9.50 |
| Cast iron borings | 3.50 to | 4.00 |
| Short shoveling turnings | 4.00 to | 4.50 |
| Machine shop turnings | 4.00 to | 4.50 |
| Rerolling rails | 10.50 to | 11.00 |
| Steel rails, less than 3 ft. | 9.25 to | 9.75 |
| Steel rails, less than 2 ft. | 10.00 to | 10.50 |
| Angle bars, steel | 8.25 to | 8.75 |
| Cast iron carwheels | 8.50 to | 9.00 |
| Railroad malleable | 7.00 to | 7.50 |
| Agricultural malleable | 7.00 to | 7.50 |
| *Relaying rails, 56 to 60 lb. | 19.00 to | 21.00 |
| *Relay. rails, 65 lb. and up | 22.00 to | 27.00 |

*Per Net Ton*

| | | |
|---|---|---|
| Iron angle and splice bars | 7.00 to | 7.50 |
| Iron arch bars, transoms | 7.50 to | 8.00 |
| Iron car axles | 13.50 to | 14.50 |
| Steel car axles | 10.50 to | 11.00 |
| No. 1 railroad wrought | 6.50 to | 7.00 |
| No. 2 railroad wrought | 6.75 to | 7.25 |
| No. 1 busheling | 5.00 to | 5.50 |
| No. 2 busheling | 4.00 to | 4.50 |
| Locomotive tires, smooth | 8.00 to | 9.00 |
| Pipes and flues | 3.50 to | 4.00 |
| No. 1 machinery cast | 8.50 to | 9.00 |
| No. 1 railroad cast | 7.00 to | 7.50 |
| No. 1 agricultural cast | 7.00 to | 7.50 |
| Stove plate | 6.25 to | 6.75 |
| Grate bars | 5.50 to | 6.00 |
| Brake shoes | 5.75 to | 6.25 |

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

## PHILADELPHIA

Per gross ton delivered consumers' yards:

| | | |
|---|---|---|
| No. 1 heavy melting steel | $7.25 to | $8.25 |
| No. 2 heavy melting steel | 6.50 to | 7.00 |
| No. 1 railroad wrought | 9.50 to | 10.00 |
| Bundled sheets | | 6.00 |
| Hydraulic compressed, new | 7.00 to | 7.50 |
| Hydraulic compressed, old | 6.00 to | 6.50 |
| Machine shop turnings | | 4.50 |
| Heavy axle turnings | 7.00 to | 8.00 |
| Cast borings (nom.) | | 3.50 |
| Heavy breakable cast | 9.00 to | 9.50 |
| Stove plate (steel works) | 7.00 to | 7.50 |
| No. 1 low phos. hvy | 11.00 to | 12.00 |
| Couplers and knuckles | 10.00 to | 10.50 |
| Rolled steel wheels | 9.50 to | 10.00 |
| No. 1 blast furnace | | 3.50 |
| Spec. iron and steel pipe | | 10.50 |
| Shafting | 15.00 to | 15.50 |
| Steel axles | 15.00 to | 15.50 |
| No. 1 forge fire | 7.50 to | 8.00 |
| Cast iron carwheels | 11.50 to | 12.00 |
| No. 1 cast | 10.00 to | 10.50 |
| Cast borings (chem.) | 11.50 to | 12.00 |
| Steel rails for rolling | | 10.50 |

## CLEVELAND

Per gross ton delivered consumers' yards:

| | | |
|---|---|---|
| No. 1 heavy melting steel | $7.50 to | $8.00 |
| No. 2 heavy melting steel | 6.75 to | 7.25 |
| Compressed sheet steel | 7.00 to | 7.25 |
| Light bundled sheet stampings | 6.00 to | 6.50 |
| Drop forge flashings | 6.00 to | 6.25 |
| Machine-shop turnings | 4.75 to | 5.25 |
| Short shoveling turnings | 5.75 to | 6.25 |
| No. 1 busheling | 6.50 to | 6.75 |
| Steel axle turnings | 7.50 to | 8.00 |
| Low phos., billet crops | 14.00 to | 14.50 |
| Cast iron borings | 5.25 to | 5.75 |
| Mixed borings and short turnings | 5.25 to | 5.75 |
| No. 2 busheling | 5.25 to | 5.75 |
| No. 1 cast | 9.00 to | 9.50 |
| Railroad grate bars | 6.00 to | 6.50 |
| Stove plate | 6.00 to | 6.50 |
| Rails under 3 ft. | 15.00 to | 15.50 |
| Rails for rolling | 13.00 to | 13.50 |
| Railroad malleable | 11.00 to | 11.25 |

## BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

| | | |
|---|---|---|
| No. 1 heavy melting steel | | $8.50 |
| No. 2 heavy melting scrap | $7.00 to | 7.50 |
| Scrap rails | 9.50 to | 10.00 |
| New hydraul. comp. sheets | | 7.00 |
| Old hydraul. comp. sheets | | 6.00 |
| Drop forge flashings | | 7.00 |
| No. 1 busheling | 7.25 to | 7.75 |
| Hvy. steel axle turnings | 8.00 to | 8.50 |
| Machine shop turnings | 4.50 to | 5.00 |
| Knuckles and couplers | | 10.00 |
| Coil and leaf springs | | 10.00 |
| Rolled steel wheels | | 10.00 |
| Low phos. billet crops | 12.50 to | 13.00 |
| Short shov. steel turnings | 7.00 to | 7.50 |
| Short mixed borings and turnings | 6.00 to | 6.50 |
| Cast iron borings | 6.00 to | 6.50 |
| No. 2 busheling | 4.50 to | 5.00 |
| Steel car axles | | 12.00 |
| Iron axles | 16.00 to | 16.50 |
| No. 1 machinery cast | 10.00 to | 10.50 |
| Stove plate | 8.25 to | 8.50 |
| Steel rails, 3 ft. and under | 12.00 to | 12.50 |
| Cast iron carwheels | 10.50 to | 11.00 |
| Industrial malleable | 10.00 to | 10.50 |
| Railroad malleable | 10.00 to | 10.50 |
| Chemical borings | 9.00 to | 9.50 |

## BIRMINGHAM

Per gross ton delivered consumers' yards:

| | | |
|---|---|---|
| Heavy melting steel | $8.50 to | $9.00 |
| Scrap steel rails | 8.00 to | 8.50 |
| Short shoveling turnings | 4.00 to | 5.00 |
| Stove plates | | 6.00 |
| Steel axles | | 14.00 |
| Iron axles | | 14.00 |
| No. 1 railroad wrought | | 6.50 |
| Rails for rolling | | 10.00 |
| No. 1 cast | | 9.00 |
| Tramcar wheels | 10.00 to | 10.25 |
| Cast iron borings, chem. | 12.00 to | 12.50 |

## ST. LOUIS

Dealers' buying prices per gross ton:

| | | |
|---|---|---|
| Selected heavy steel | $7.00 to | $7.50 |
| No. 1 heavy melting | 6.50 to | 7.00 |
| No. 2 heavy melting | 6.50 to | 7.00 |
| No. 1 locomotive tires | 8.00 to | 8.50 |
| Misc. stand-sec. rails | 8.00 to | 8.50 |
| Railroad springs | 8.75 to | 9.25 |
| Bundled sheets | 4.25 to | 4.75 |
| No. 2 railroad wrought | 6.50 to | 7.00 |
| No. 1 busheling | 6.00 to | 6.50 |
| Cast iron borings and shoveling turnings | 4.75 to | 5.25 |
| Iron rails | 7.00 to | 8.00 |
| Rails for rolling | 9.50 to | 10.00 |
| Machine shop turnings | 3.00 to | 3.50 |
| Heavy turnings | 5.50 to | 6.00 |
| Steel car axles | 10.00 to | 10.50 |
| Iron car axles | 14.00 to | 14.50 |
| Wrot. iron bars and trans. | 5.00 to | 5.50 |
| No. 1 railroad wrought | 4.75 to | 5.25 |
| Steel rails, less than 3 ft. | 10.00 to | 10.50 |
| Steel angle bars | 6.75 to | 7.25 |
| Cast iron carwheels | 6.50 to | 7.00 |
| No. 1 machinery cast | 8.00 to | 8.50 |
| Railroad malleable | 5.50 to | 6.00 |
| No. 1 railroad cast | 6.25 to | 6.75 |
| Stove plate | 6.00 to | 6.50 |
| Relay. rails, 60 lb. and under | 16.00 to | 16.50 |
| Relay. rails, 70 lb. and over | 20.00 to | 21.00 |
| Agricult. malleable | 5.00 to | 5.50 |

## NEW YORK

Dealers' buying prices per gross ton:

| | | |
|---|---|---|
| No. 1 heavy melting steel | $4.25 to | $5.50 |
| Heavy melting steel (yard) | 2.75 to | 3.00 |
| No. 1 hvy. breakable cast | | 5.50 |
| Stove plate (steel works) | 3.00 to | 3.50 |
| Machine shop turnings | 1.75 to | 2.00 |
| Short shoveling turnings | 1.75 to | 2.00 |
| Cast borings | 1.75 to | 2.00 |
| No. 1 blast furnace | 1.75 to | 2.00 |
| Steel car axles | 10.00 to | 10.50 |
| Iron car axles (nom.) | 14.00 to | 14.50 |
| Spec. iron and steel pipe | | 5.00 |
| Forge fire | 3.00 to | 3.25 |
| No. 1 railroad wrought | 5.00 to | 5.25 |
| No. 1 yard wrought, long | 4.00 to | 4.25 |
| Rails for rolling | 6.00 to | 6.25 |
| Stove plate (foundry) | 4.75 to | 5.25 |
| Malleable cast (railroad) | 6.00 to | 6.50 |
| Cast borings (chemical) | 8.00 to | 8.50 |

Per gross ton, delivered local foundries:

| | |
|---|---|
| No. 1 machinery cast | $8.50 |
| No. 1 hvy. cast (cupola size) | 6.50 |
| No. 2 cast | 5.50 |

## BOSTON

Dealers' buying prices per gross ton:

| | | |
|---|---|---|
| No. 1 heavy melting steel | $3.80 to | $4.60 |
| Scrap T rails | 3.10 to | 4.60 |
| Machine shop turnings | 1.25 to | 2.10 |
| Cast iron borings | 1.50 to | 1.75 |
| Bundled skeleton, long | 3.00 to | 3.25 |
| Forge flashings | 3.00 to | 3.50 |
| Blast furnace scrap | 1.25 to | 1.30 |
| Forged scrap | 2.00 to | 2.50 |
| Shafting | 10.00 to | 10.50 |
| Steel car axles | 11.00 to | 12.00 |
| Wrought pipe | 4.00 to | 4.25 |
| Rails for rolling | 6.00 to | 6.50 |
| Cast iron borings, chemical | 7.00 to | 7.25 |

Per gross ton delivered consumers' yards:

| | | |
|---|---|---|
| Textile cast | $8.75 to | $9.25 |
| No. 1 machinery cast | 8.75 to | 9.25 |
| Stove plate | 5.00 to | 5.25 |
| Railroad malleable | 10.50 to | 11.00 |

## CINCINNATI

Dealers' buying prices per gross ton:

| | | |
|---|---|---|
| Heavy melting steel | $6.75 to | $7.25 |
| Scrap rails for melting | 8.50 to | 9.00 |
| Loose sheet clippings | 3.50 to | 4.00 |
| Bundled sheets | 5.50 to | 6.00 |
| Cast iron borings | 3.25 to | 3.75 |
| Machine shop turnings | 4.00 to | 4.50 |
| No. 1 busheling | 5.00 to | 5.50 |
| No. 2 busheling | 3.25 to | 3.75 |
| Rails for rolling | 9.00 to | 9.50 |
| No. 1 locomotive tires | 8.50 to | 9.00 |
| Short rails | 11.75 to | 12.25 |
| Cast iron carwheels | 8.25 to | 8.75 |
| No. 1 machinery cast | 10.00 to | 10.50 |
| No. 1 railroad cast | 8.75 to | 9.25 |
| Burnt cast | 4.25 to | 4.75 |
| Stove plate | 4.25 to | 4.75 |
| Agricultural malleable | 8.00 to | 8.50 |
| Railroad malleable | 9.00 to | 9.50 |

## DETROIT

Dealers' buying prices per gross ton:

| | | |
|---|---|---|
| Hvy. melting | $6.00 to | $6.50 |
| Borings and short turnings | 3.75 to | 4.25 |
| Long turnings | 3.50 to | 4.00 |
| No. 1 machinery cast | 8.50 to | 9.00 |
| Automotive cast | 11.00 to | 11.50 |
| Hydraul. comp. sheets | 5.75 to | 6.25 |
| Stove plate | 5.00 to | 5.50 |
| New No. 1 busheling | 5.00 to | 5.50 |
| Old No. 2 busheling | 3.25 to | 3.75 |
| Sheet clippings | 3.50 to | 4.00 |
| Flashings | 5.25 to | 5.75 |

## CANADA

Dealers' buying prices per gross ton:

| | Toronto | Montreal |
|---|---|---|
| Heavy melting steel | $7.00 | $6.00 |
| Rails, scrap | 7.00 | 6.00 |
| No. 1 wrought | 6.00 | 8.00 |
| Machine shop turnings | 2.00 | 2.00 |
| Boiler plate | 5.00 | 4.50 |
| Heavy axle turnings | 2.50 | 2.50 |
| Cast borings | 2.00 | 2.00 |
| Steel borings | 2.00 | 2.00 |
| Wrought pipe | 2.00 | 2.00 |
| Steel axles | 7.00 | 9.00 |
| Axles, wrought iron | 7.00 | 11.00 |
| No. 1 machinery cast | 12.50 | 10.00 |
| Stove plate | 10.00 | 8.00 |
| Standard carwheels | 11.00 | 8.50 |
| Malleable | 10.00 | 8.00 |

# Warehouse Prices for Iron and Steel Products

## CHICAGO

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.00c. |
| Soft steel bars | 2.75c. |
| Reinforcing bars, billet steel | 1.50c. to 1.80c. |
| Rail steel reinforcement— | |
| For buildings | 1.30c. to 1.40c. |
| Road slabs, bridges, culverts | 1.40c. |
| Cold-fin. steel bars and shafting— | |
| Rounds and hexagons | 3.10c. |
| Flats and squares | 3.60c. |
| Bands, ¼ in. (in Nos. 10 and 12 gages) | 2.95c. |
| Hoops (No. 14 gage and lighter) | 3.50c. |
| Hot-rolled annealed sheets (No. 24) | 3.55c. |
| Galv. sheets (No. 24) | 4.10c. |
| Hot-rolled sheets (No. 10) | 3.20c. |
| Spikes (⅜ in. and larger) | 3.45c. |
| Track bolts | 4.30c. |
| Rivets, structural | 4.00c. |
| Rivets, boiler | 4.00c. |
| | Per Cent Off List |
| Machine bolts | 73 |
| Carriage bolts | 73 |
| Coach and lag screws | 73 |
| Hot-pressed nuts, sq., tap. or blank | 73 |
| Hot-pressed nuts, hex., tap. or blank | 73 |
| No. 8 black ann'l'd wire, per 100 lb. | $2.45 |
| Com. wire nails, base per keg | 2.30 |
| Cement c't'd nails, base per keg | 2.30 |

## CLEVELAND

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 2.95c. |
| Soft steel bars | 2.75c. |
| Reinforc. steel bars | 1.75c. to 1.95c. |
| Cold-fin. rounds and hex. | 3.30c. |
| Cold-fin. flats and sq. | 3.60c. |
| Hoops and bands, No. 12 to ⅜ in., inclusive | 2.90c. |
| Hoops and bands, No. 13 and lighter | 3.50c. |
| Cold-finished strip | *3.55c. |
| Hot-rolled annealed sheets (No. 24) | 3.60c. |
| Galvanized sheets (No. 24) | 4.00c. |
| Hot-rolled sheets (No. 10) | 3.00c. |
| No. 9 ann'l'd wire, per 100 lb. | $2.25 |
| No. 9 galv. wire, per 100 lb. | 2.70 |
| Com. wire nails, base per keg | 2.25 |

*Net base, including boxing and cutting to length.

## CINCINNATI

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.25c. |
| Bars, soft steel or iron | 3.00c. |
| New billet reinforc. bars | 3.00c. |
| Rail steel reinforc. bars | 3.00c. |
| Hoops | 3.90c. |
| Bands | 3.20c. |
| Cold-fin. rounds and hex. | 3.50c. |
| Squares | 4.00c. |
| Hot-rolled annealed sheets (No. 24) | 3.75c. |
| Galv. sheets (No. 24) | 4.25c. |
| Hot-rolled sheets (No. 10) | 3.20c. |
| Structural rivets | 4.20c. |
| Small rivets | 60 per cent off list |
| No. 9 ann'l'd wire, per 100 lb. | $3.00 |
| Com. wire nails, base per keg (10 to 49 kegs) | 2.65 |
| Larger quantities | 2.50 |
| Cement c't'd nails, base 100-lb. keg | 2.95 |
| Chain, per 100 lb. | 10.25 |
| | Net per 100 Ft. |
| Seamless steel boiler tubes, 2-in. | $17.50 |
| 4-in. | 36.00 |
| Lap-welded steel boiler tubes, 2-in. | 16.50 |
| 4-in. | 34.50 |

## BUFFALO

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.25c. |
| Soft steel bars | 3.00c. |
| Reinforcing bars | 2.65c. |
| Cold-fin. flats and sq. | 3.65c. |
| Rounds and hex. | 3.15c. |
| Cold-rolled strip steel | 5.25c. |
| Hot-rolled annealed sheets (No. 24) | 3.70c. |
| Galv. sheets (No. 24) | 4.10c. |
| Bands | 3.35c. |
| Hoops | 3.90c. |
| Hot-rolled sheets (No. 10) | 3.50c. |
| Com. wire nails, base per keg | $2.45 |
| Black wire, base per 100 lb. | 3.20 |

## NEW YORK

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 2.70c. to 3.10c. |
| Soft steel bars, small shapes | 2.70c. to 3.10c. |
| Iron bars | 3.24c. |
| Iron bars, Swed. charcoal | 7.00c. to 7.25c. |
| Cold-fin. shafting and screw stock: | |
| Rounds and hexagons | 3.40c. |
| Flats and squares | 3.90c. |
| Cold-roll. strip, soft and quarter hard | 4.95c. |
| Hoops | 3.75c. |
| Bands | 3.40c. |
| Hot-rolled sheets (No. 10) | 3.00c. to 3.25c. |
| Hot-rolled ann'l'd sheets (No. 24*) | 3.60c. |
| Galvanized sheets (No. 24*) | 4.00c. |
| Long terne sheets (No. 24) | 5.00c. |
| Standard tool steel | 12.00c. |
| Wire, black annealed | 4.50c. |
| Wire, galv. annealed | 5.15c. |
| Tire steel, ½ x ⅛ in. and larger | 3.40c. |
| Smooth finish, 1 to 2½ x ¼ in. and larger | 3.75c. |
| Open-hearth spring steel, bases, | 4.50c. to 7.00c. |

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

| | Per Cent Off List |
|---|---|
| Machine bolts, cut thread: | |
| ¾ x 6 in. and smaller | 65 to 65 and 10 |
| 1 x 30 in. and smaller | 65 to 65 and 10 |
| Carriage bolts, cut thread: | |
| ½ x 6 in. and smaller | 65 to 65 and 10 |
| ¾ x 20 in. and smaller | 65 to 65 and 10 |
| Boiler Tubes: | Per 100 Ft. |
| Lap Welded, 2-in. | $19.00 |
| Seamless steel, 2-in. | 20.25 |
| Charcoal iron, 2-in. | 26.25 |
| Charcoal iron, 4-in. | 67.00 |

## ST. LOUIS

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.25c. |
| Bars, soft steel or iron | 3.00c. |
| Cold-fin. rounds, shafting, screw stock | 3.35c. |
| Hot-rolled annealed sheets (No. 24) | 3.80c. |
| Galv. sheets (No. 24) | 4.35c. |
| Hot-rolled sheets (No. 10) | 3.45c. |
| Black corrug. sheets (No. 24) | 3.85c. |
| Galv. corrug. sheets | 4.40c. |
| Structural rivets | 4.00c. |
| Boiler rivets | 4.00c. |
| | Per Cent Off List |
| Tank rivets ⅞-in. and smaller, 100 lb. or more | 65 |
| Less than 100 lb. | 60 |
| Machine bolts | 73 |
| Carriage bolts | 73 |
| Lag screws | 73 |
| Hot-pressed nuts, sq., blank or tapped, 200 lb. or more | 73 |
| Less than 200 lb. | 63 |
| Hot-pressed nuts, hex., blank or tapped, 200 lb. or more | 73 |
| Less than 200 lb. | 63 |

## PACIFIC COAST

| | Base per Lb. | | |
|---|---|---|---|
| | San Francisco | Los Angeles | Seattle |
| Plates and struc. shapes, ¼-in. and heavier | 2.80c. | 3.00c. | 2.50c. |
| Soft steel bars | 2.80c. | 3.00c. | 2.50c. |
| Reinforcing bars | 2.80c. | 2.80c. | 3.00c. |
| Hot-rolled annealed sheets (No. 24) | 3.90c. | 4.00c. | 4.00c. |
| Hot-rolled sheets (No. 10) | 3.40c. | 3.50c. | 3.50c. |
| Galv. sheets (No. 24) | 4.40c. | 4.20c. | 4.50c. |
| Struc. rivets, ½ in. and larger, less than 1000 lb. | 5.00c. | 5.00c. | 5.50c. |
| Special nails; common 4 to 60d; smooth box 4 to 20d; finish 6 and 8d; base per keg | $2.55 | $2.45 | $2.40 |
| Other wire nails, base per keg | 2.80 | 2.70 | 2.65 |
| Cement c't'd nails, 100-lb. keg | 2.65 | 2.70 | 2.65 |

San Francisco and Los Angeles schedule subject to allowance of 10c. per 100 lb. for 5000 lb. or over.

Seattle schedule subject to allowance of 25c. per 100 lb. for 500 lb. or over.

## PITTSBURGH

| | *Base per Lb. |
|---|---|
| Plates | 2.85c. |
| Structural shapes | 2.85c. |
| Soft steel bars and small shapes | 2.60c. |
| Reinforcing steel bars | 2.60c. |
| Cold-finished and screw stock— | |
| Rounds and hexagons | 3.10c. |
| Squares and flats | 3.60c. |
| Bands | 2.95c. |
| Hoops | 3.60c. |
| Hot-rolled annealed sheets (No. 24), 25 or more bundles | 3.05c. |
| Galv. sheets (No. 24), 25 or more bundles | 3.85c. |
| Hot-rolled sheets (No. 10) | 3.15c. to 3.20c. |
| Galv. corrug. sheets (No. 28), per square (less than 3750 lb.) | 3.74c. |
| Spikes, large | 2.50c. |
| Small | 2.75c. to 2.90c. |
| Boat | 3.00c. |
| Track bolts, all sizes, per 100 count, | 70 and 10 per cent off list |
| Machine bolts, 100 count, | 70 and 10 per cent off list |
| Carriage bolts, 100 count, | 70 and 10 per cent off list |
| Nuts, all styles, 100 count, | 73 and 10 per cent off list |
| Large rivets, base per 100 lb. | $3.00 |
| Wire, black, soft ann'l'd, base per 100 lb. | 2.30 |
| Wire, galv. soft, base per 100 lb. | 2.75 |
| Common wire nails, per keg | 2.25 |
| Cement coated nails, per keg | 2.25 |

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

## PHILADELPHIA

| | Base per Lb. |
|---|---|
| Plates, ¼-in. and heavier | 2.50c. |
| Structural shapes | 2.50c. |
| Soft steel bars, small shapes, iron bars (except bands) | 2.60c. |
| Reinforc. steel bars, sq., twisted and deform. | 2.30c. |
| Cold-fin. steel, rounds and hex. | 3.40c. |
| Cold-fin. steel, sq. and flats | 3.90c. |
| Steel hoops | 3.15c. |
| Steel bands, No. 12 to ⅝-in., inclu. | 2.90c. |
| Spring steel | 5.00c. |
| Hot-rolled box annealed sheets (No. 24) | 3.55c. |
| Galvanized sheets (No. 24) | 4.00c. |
| Hot-rolled blue annealed sheets (No. 10) | 3.05c. |
| Diam. pat. floor plates, ¼ in. | 5.10c. |
| Swedish iron bars | 6.60c. |

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

## BOSTON

| | Base per Lb. |
|---|---|
| Plates | *3.35c. |
| Structural shapes | *3.35c. |
| Soft steel bars, small shapes | *3.25c. |
| Reinforcing bars | 3.10c. to 3.25c. |
| Iron bars— | |
| Refined | 3.25c. |
| Best refined | 4.60c. |
| Spring steel, open-hearth | 5.00c. |
| Tire steel | 4.50c. to 4.75c. |
| Bands | *3.75c. to 4.25c. |
| Hoop steel | 4.90c. to 5.40c. |
| Cold-rolled steel— | |
| Rounds and hex. | 3.50c. to 5.50c. |
| Squares and flats | 4.00c. to 6.00c. |
| Rivets, structural or boiler | 4.80c. |
| | Per Cent Off List |
| Machine bolts | 70 |
| Carriage bolts | 70 |
| Lag screws | 70 |
| Hot-pressed nuts | 40 and 10 |
| Cold-punched nuts | 40 and 10 |
| Stove bolts | 70 and 10 |

*Base price (250 to 999 lb.); less than 250 lb., add 50c. per 100 lb.; 1000 to 7999 lb., deduct 15c.; 8000 to 14,999 lb., deduct 25c.; 15,000 lb. and larger lots, deduct 35c.

# Fabricated Structural Steel

## New Projects of 17,500 Tons Include 3300-Ton Bank Building in New York —Awards 9500 Tons

NEW fabricated structural steel projects of 17,500 tons compare with 31,000 tons a week ago, but only 13,000 tons two weeks ago. Of this week's total, 7700 tons is in highway bridges for Illinois, Minnesota, Missouri, Texas, Oklahoma and Florida. In New York, a building for the First National Bank requires 3300 tons, and a laundry for the Knickerbocker Ice Co., 900 tons.

Awards of the week at 9500 tons are the smallest since the last week in October. Included are 500 tons for the Cosmopolitan Club in New York and 600 tons for bridges in Oklahoma. Awards follow:

### NORTH ATLANTIC STATES

**Cambridge, Mass.,** 500 tons, apartment house, to Lehigh Structural Steel Co.

**Lakeville-Middleboro, Littleton, Mass.,** bridge, 132 tons, to Boston Bridge Works, Inc.

**New York,** 500 tons, Cosmopolitan Club, to Harris Structural Steel Co.

**New Rochelle, N. Y.,** 150 tons, armory, to Lehigh Structural Steel Co.

**Pelham, N. Y.,** 200 tons, highway bridge on Boston Post Road, to American Bridge Co.

**Dannemora, N. Y.,** 200 tons, State prison building, to American Bridge Co.

**Cold Spring, N. Y.,** 1200 tons, stone crushing plant, to American Bridge Co.

**State of New York,** 200 tons, highway bridge, to American Bridge Co.

**State of New York,** 200 tons, highway bridge, to Lackawanna Steel Construction Co.

**Piney Branch, N. Y.,** 135 tons, road underpass, to Lehigh Structural Steel Co.

**Philadelphia,** 180 tons, district office building for Electric Realty Corpn., to McClintic-Marshall Corpn.

**Irwin, Pa.,** 250 tons, State highway bridge, to McClintic-Marshall Corpn.

**State of Maryland,** 130 tons, highway bridges at Elkton, to Phoenix Bridge Co.

### CENTRAL STATES

**Ottawa, Ohio,** 200 tons, State highway bridge, to International Derrick & Equipment Co.

**Columbus, Ohio,** 240 tons, post office, to Midland Structural Steel Co.

**Chicago,** 1250 tons, power house for Union Station, to American Bridge Co.

**Chicago, Burlington & Quincy Railroad,** 100 tons, bridge work, to an unnamed bidder.

**Cincinnati,** 170 tons, warehouse, to Dayton Structural Steel Co.

**Bedford, Ohio,** 100 tons, highway bridge, to Mount Vernon Bridge Co.

**Jefferson City, Ill.,** 250 tons, bridge to Vincennes Bridge Co.

**Waterloo, Iowa,** 230 tons, building, to Pittsburgh-Des Moines Steel Co.

**Kansas City, Mo.,** 140 tons, East Side high school, to Kansas City Structural Steel Co.

### SOUTH AND SOUTHWEST

**Mobile, Ala.,** 120 tons, girders for car ferry apron of A. T. & N. Railroad, to Virginia Bridge & Iron Co.

**Tuskegee, Ala.,** 200 tons, science building at Tuskegee Institute, to Southern Steel Works.

**New Orleans,** 440 tons, Toulouse Street wharf for Port of New Orleans, to Jones & Laughlin Steel Corpn.

**Ada and Lawton, Okla.,** 600 tons, bridges, to J. B. Klein Iron & Foundry Co., Oklahoma City.

### WESTERN STATES

**Fremont County, Idaho,** 160 tons, St. Anthony highway bridge, to Virginia Bridge & Iron Co.

**Los Angeles,** 200 tons, Virgil high school, to International Stacey Corpn.

**Long Beach, Cal.,** 200 tons, tank foundations, to Western Pipe & Steel Co.

**Long Beach,** 100 tons, Pacific Freight Depot, to Soule Steel Co.

**Alaska,** 175 tons, schooner boxes, to Canal Boiler Works.

### CANADA

**Winnipeg, Man.,** 600 tons, viaduct at Saulter Street for City Council, to Dominion Bridge Co.

### STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

### NORTH ATLANTIC STATES

**Wellesley, Mass.,** 207 tons, college building.

**Carmel, Me.,** 140 tons, State bridge.

**Waltham, Mass.,** 100 tons, medical and surgical unit.

**New York,** 3300 tons, First National Bank Building.

**Attica, N. Y.,** 350 tons, State prison cell block.

**Philadelphia,** 200 tons, Woodland central office building for Bell Telephone Co.

**Philadelphia,** unstated tonnage, additional building for Blumenthal Brothers at James and Margaret Streets.

**Washington,** 600 tons, addition to Congressional Library.

**New York,** 120 tons, art gallery at 19-21 East Sixty-fourth Street.

**New York,** 130 tons, alterations to building at 613 West Fortieth Street.

**New York,** 200 tons, Boyertown Burial Casket Co. building.

**Newark, N. J.,** 200 tons, Star Electric Motor Co. factory building on Riverside Avenue.

**Long Island City,** 900 tons, Knickerbocker Ice Co. laundry building on Dreyer Avenue.

### CENTRAL STATES

**Cleveland,** 150 tons, warehouse for Goodyear Tire & Rubber Co.

**White County, Ill.,** 850 tons, highway bridge; A. Guthrie & Co. low bidders on general contract.

**Williamson County, Ill.,** 232 tons, highway bridge; Vincennes Bridge Co., low bidder.

**Seneca, Ill.,** 2000 tons, bridge.

**Morris, Ill.,** 1800 tons, highway bridge.

**State of Minnesota,** 1200 tons, highway bridges.

**State of Missouri,** 1600 tons, highway bridges.

**Springfield, Mo.,** 300 tons, United States hospital for delinquent defectives; J. A. Holpuch Co., low bidder on general contract.

**Alma, Wis.,** 620 tons, dam on Mississippi River; project postponed indefinitely.

**Hinsdale, Ill.,** 250 tons, addition to home for women.

**New Ulm, Minn.,** 400 tons, highway bridge.

### SOUTH AND SOUTHWEST

**Harvey, La.,** 525 tons, Intercoastal Canal for United States Government; bids open Dec. 15.

**Warren, Tex.,** 160 tons, highway bridge.

**Atoka, Okla.,** 187 tons, highway bridge.

**Lynchburg, Va.,** 350 tons, post office.

**Yulee, Fla.,** 300 tons, State highway bridge.

### WESTERN STATES

**Los Angeles,** 200 tons, telephone building.

**Del Rey, Cal.,** 100 tons, high school.

**Vernon, Cal.,** 1100 tons, power station.

### FABRICATED PLATE

### AWARDS

**Orange County, Cal.,** 100 tons, two water district tanks, to Pittsburgh-Des Moines Steel Co.

**Buffalo,** 150 tons, plate roof, Buffalo Tank Corpn. building, to Truscon Steel Co.

**Philadelphia,** 240 tons, substation housing for Philadelphia Electric Co., to Bressler Metal Works Co., Lebanon.

### PENDING PROJECTS

**Seattle,** 300 tons, West Seattle reservoir overflow.

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# Materials Handling Institute Formed

Manufacturers of material handling equipment formed the Materials Handling Institute with an initial membership of about 60, at a meeting in the Hollenden Hotel, Cleveland, Dec. 8.

The purpose of the organization is to provide a central body for conducting and coordinating research and educational work of the material handling industry.

F. E. Moore, president, Mathews Conveyor Co., Ellwood City, Pa., was elected president; Jarvis B. Webb, Jarvis B. Webb Co., Detroit, vice-president; H. W. Standart, president, Northern Engineering Works, Detroit, treasurer, and John A. Cronin, editor, *Materials Handling and Distribution*, secretary.

The board of governors, composed of one representative from each group of material handling equipment manufacturers, is as follows: Hoist and crane makers, H. W. Standart; gravity and roller conveyors, F. E. Moore; continuous conveyors, Jarvis B. Webb; floor truck and caster manufacturers, J. F. Thomas, assistant general manager, Nutting Truck Co., Faribault, Minn.; portable and bulk conveyors, Brinton Welser, Chainbelt Co.; lift trucks and portable elevators, E. F. Twyman, Barrett-Cravens, Chicago; Industrial trucks and tractors, Samuel W. Gibb, Yale & Towne Mfg. Co.; transmissions, William E. Bee, treasurer, Palmer-Bee Co., Detroit; crawler cranes and industrial locomotives, H. H. Perry, Whitcomb Locomotive Co., Rochelle, Ill.; tramrail, A. F. Anjeskey, sales manager, tramrail division, Cleveland Crane & Engineering Co.; accessories, Richard F. Straw, American Kron Scale Co., New York.

The next meeting will be held in Philadelphia in the week of May 2, during the convention and exhibit of the American Foundrymen's Association and the meeting of the materials handling division of the American Society of Mechanical Engineers.

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Wickes Boiler Co., Saginaw, Mich., has installed a modern X-ray machine and complete laboratory facilities to test fabricated welded pressure vessels and power boiler drums in accordance with the A. S. M. E. fusion welding codes.

## Synthetic Resins for Metal Products

(*Concluded from page* 1483)

finish on metal, the product is usually either pickled thoroughly or sand blasted to remove all grease and oil adhering to the surface after stamping, drawing or machining.

**Long-Oil Priming Coat Applied**

Immediately, and with a minimum of handling, to retain the thoroughly cleaned surface, a coat of priming paint, usually a long-oil mixture containing the synthetic resin, is applied and the article moved into the drying or baking chamber for a few minutes. When completely dried, the metal finisher applies the finishing coat, which is usually a shorter oil mixture. If durability, toughness and elasticity are important, it is mixed with a synthetic resin base as in the case of the priming coat.

When a product is to be baked, a shorter oil mixture is commonly used, both for priming and finishing, than in the case of a finish to be applied by brush or paint spray and air dried.

**Aluminum Paint Widely Used**

In addition to the wide range of enamel finishes for metal, developed with synthetic resins in recent years, aluminum paint has come into wide use as a finish for metal, especially when the surface is exposed to weathering. An example is the George Washington Memorial Bridge over the Hudson River, part of the aluminum paint on which was supplied by Edward Smith & Co.

By the use of aluminum paint it is estimated that the weight of the finishing coats will be about one-sixth the weight of a white lead finish. In this case, the paint manufacturer furnished a gallon of long-oil synthetic resin mixture for every 2 lb. of ground aluminum, and the finish was mixed on the job as the painter used it. In this way, the surface coating is expected to remain bright for a long period after application.

Where the aluminum paint is to be used only for its weather-resistant properties, and a leaden appearance is not objectionable, the paint manufacturer may mix the coating ready for use. This was done recently by Edward Smith & Co., for use by the unemployed in painting highway bridges in New Jersey. It was not considered desirable to permit many inexperienced men to mix the aluminum paint as applied, and so it was prepared in advance.

While the manufacturers of varnishes and enamels have been actively developing new metal finishes and have many highly durable coatings for metal, offering the metal products manufacturer better wearing and better appearing finishes for his goods, improvements are still being developed in the laboratories, which promise still better coatings for metal products.

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## Deep-Drawing Tubular Steel Spokes

(*Concluded from page* 1481)

spoke used in artillery-type wheels, being tubular in form except the lower or hub end, which is an open end rectangular shape and tapered to fit in a standard wheel hub. At the outer end, which is closed, the tubular section is reduced in diameter a distance of about ¾ in. to provide a tenon that fits in the rim when the wheel is assembled.

A tube about 7 in. long x 1⅜ in. in diameter with a flange about 5 in. in diameter at the base is drawn without annealing, which is an interesting accomplishment in deep drawing. Up to this point in the operations the steel has not been fractured or in any way damaged. Eleven operations are required in the manufacture of the spoke, ten of which are press operations. Most of the operations are simple drawing operations.

The first is blanking and drawing, in which the piece takes its cylindrical form about 5 in. in diameter with a narrow flange at the base. The next four operations are redrawing operations, in which the cylindrical section is reduced in diameter and lengthened until it reaches its finished length and diameter. The flange becomes wider in each operation as it retains its original diameter. In the last of these operations the tenon is partly formed. The flange at the base is trimmed in the sixth operation to a proper diameter for producing the rectangular shell that later takes on its tapered form. Then the piece is normalized to take out internal strains set up by redrawing.

The rectangular end that later becomes the tapered part of the spoke is then formed in the two next drawing operations from the metal that is in the flange. After the correct rectangular form has been produced a surplus amount of metal is trimmed off the end, leaving the spoke about 8¾ in. long or the finished length.

An interesting example of deep drawing and forming is found in changing the rectangular end to its tapered form. After finding the correct finished size that the rectangular shape should have to get the necessary taper it was necessary to solve the problem of disposing of the surplus amount of metal, which was the difference between that in the rectangular shape and the amount required in the tapered end.

This problem was solved by tucking in or forming the surplus metal at the four corners and closing the sides down to the required taper. The four corners are tucked in by means of a semi-automatic cam-type die, which bends in the edges, causing the rectangular end to take a wedge-shape form. Tucks are drawn together into plaits gradually decreasing in width from the end of the spoke to the upper part of the tapered section, providing the definite taper at the end of the spoke. The surplus material that is folded into the corners in these operations serves as reinforcement.

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## Mechanical Handling for Small Foundries

(*Concluded from page* 1491)

ranged in a long line parallel to the line of molders and at the end of the gravity roll; but in other cases, particularly where crane service is available, a large central shakeout hopper is provided at some convenient point and molds are brought to this by the crane. Where small or medium-size castings are handled and a series of shakeout hoppers used, a casting conveyor is sometimes provided to collect the castings and deliver them to some convenient point.

"It has been definitely proved that sand, mold and casting handling systems, such as described, can be installed to advantage and show a material saving in foundries with melting capacity as low as 25 tons a day. A complete sand and mold-handling unit can be used to advantage, to serve as few as 12 molding machines, and complete systems of practically any size can usually be installed in existing buildings, with a total cost of from $2,000 to $3,500 for each molding machine served.

"Such handling systems effect a saving in practically every operation in the foundry. The molder is relieved of carrying his completed mold and setting it on the floor; instead, he merely shifts it from the molding machine to a mold conveyor set at a convenient height. He is relieved of shoveling sand, but instead receives uniformly prepared sand from a hopper discharging directly to his flask.

"Use of a complete system of handling equipment is not confined in any way to large producers of standardized products. It is being used to distinct advantage by the medium-size and small jobbing shops, producing a variety of castings and with melting capacities of from two to three tons an hour. In the still smaller foundries portable or semi-portable equipment can be used. In any case the foundry manager who is vitally interested in cutting costs should give careful and serious consideration to the handling methods in his foundry."

# British Domestic Steel Business Active; Argentina to Buy 70,000 Tons of Tubes

(*By Cable*)

LONDON, ENGLAND, Dec. 7.

GOVERNMENT circles give the impression that duties on iron and steel are not likely before the next budget, pointing out that there is opposition to taxing raw materials of any basic industry. However, immediate action is to be urged in the House of Commons on Wednesday.

Domestic demand for iron and steel is improving slowly, but export is still quiet. Fair domestic buying and awards of contracts by the railroads are enabling steel mills to maintain current output.

British purchases of steel on the Continent have been materially reduced by fluctuation of the exchange. Continental quotations in gold pounds sterling are weaker, reflecting the downward trend in business.

German mills having completed Soviet orders, certain plants are only able to operate part time. The Henschel locomotive works in Germany is preparing to close entirely.

In Poland, the Bismarckhütte is negotiating with Argentina on a contract for 70,000 tons of steel tubes. Official permission to suspend operation of the Laurahütte in Poland has been refused.

A 12 per cent increase of the tariff on wire and wire nails is being urged by manufacturers in Holland.

The International Wire Export Co., known as "Iweco" has been organized in Brussels, Belgium, to handle export sales and control prices on wire products of French, Dutch, Danish, Czechoslovakian and certain Near Eastern mills.

A buying movement has developed in Welsh tin plate while mills have been endeavoring to stabilize prices in line with gold values. Leading Welsh interests are pressing other mills to adopt a central selling plan for export. Consideration is also being given to reintroduction of a minimum tin plate price, possibly about 1s. 6d. per base box higher than the current quotation.

Export sales of tin plate are expanding and some substantial American business has been booked. Domestic canning activity has increased rapidly and packers are buying supplies.

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## British Study World Building Codes

LONDON, ENGLAND, Nov. 30.—The first report of the Steel Structures Research Committee of the Department of Scientific and Industrial Research has been issued. The committee has been working since 1929 with the British Steel Works Association, gathering data on regulations for structural steel buildings in various countries, with a view to recommending revision of building codes in England. It is suggested that present British codes require safety factors in construction far greater than necessary building.

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## Leipzig Fair to Refund Buyers' Expenses

HAMBURG, GERMANY, Nov. 30.—Visitors to the Leipzig Fair next spring will receive refunds of traveling expenses if orders are placed during the time they are in Leipzig. The Leipzig Fair board has compiled a table, listing the various countries and the amount of traveling expense which will be refunded, and stating the total value of goods to be bought at the fair to obtain the refund. This plan is expected to increase both the number of exhibitors and buyers from abroad.

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## European Wire Rod Price Reduced to Japan

HAMBURG, GERMANY, Nov. 30.—The quotation of the Continental Wire Rod Cartel, which was recently reduced to $28 a ton, c.i.f. Far Eastern ports, to meet American competition, has been further reduced. Present wire rod offers are at $27.80 to $27.95 a ton, c.i.f. Yokohama, and about 2000 tons have been sold at these prices.

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## Steel with Mirror Polish

LONDON, ENGLAND, Nov. 30.—Special, highly polished strip steel, used for radio voice recording equipment and sound motion pictures, is to be made in the Sheffield district. This steel with mirror finish has been furnished by Swedish makers, but Samuel Fox & Co., Stockbridge, are installing new equipment for its production. The potential market for this product is estimated at $500,000 annually.

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## Lower Stainless Steel Prices Expected

HAMBURG, GERMANY, Nov. 30.—While no revision of stainless steel prices has been announced by either the Friedrich Krupp A. G. or the leading British makers, Thomas Firth & Sons and John Brown & Co., a reduction is generally expected by buyers. Concessions in price are being granted by other makers, especially the Swedish producers, who are quoting lower export prices.

### British and Continental European Export Prices f.o.b. United Kingdom and Continental Ports

#### British Prices, f.o.b. United Kingdom Ports

*Per Gross Ton, £ at $3.35*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ferromanganese, export | £9 | 0s. | | | | $30.15 | | |
| Billets, open-hearth | 5 | 7½ | to | £5 | 12½s. | 18.00 | to | $18.84 |
| Black sheets, Japanese specifications | 9 | 15 | to | 10 | 0 | 32.65 | to | 33.50 |
| Tin plate, per base box | 0 | 13¾ | to | 0 | 14¼ | 2.30 | to | 2.38 |
| | | | | | | Cents a Lb. | | |
| Steel bars, open-hearth | 7 | 17½ | to | 8 | 7½ | 1.18 | to | 1.25 |
| Beams, open-hearth | 7 | 7½ | to | 7 | 17½ | 1.10 | to | 1.18 |
| Channels, open-hearth | 7 | 12½ | to | 8 | 2½ | 1.14 | to | 1.22 |
| Angles, open-hearth | 7 | 7½ | to | 7 | 17½ | 1.10 | to | 1.18 |
| Black sheets, No. 24 gage | 8 | 5 | to | 8 | 10 | 1.23 | to | 1.27 |
| Galvanized sheets, No. 24 gage | 9 | 5 | | | | 1.38 | | |

#### Continental Prices, f.o.b. Continental Ports

*Per Metric Ton, Gold £ at $4.86*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Billets, Thomas | £2 | 11s. | to | £2 | 12s. | $12.41 | to | $12.65 |
| Wire rods, No. 5 B.W.G. | 5 | 5 | | | | 25.51 | | |
| Black sheets, No. 31 gage, Japanese | 11 | 5 | | | | 54.68 | | |
| | | | | | | Cents a Lb. | | |
| Steel bars, merchant | 2 | 16 | to | 2 | 17 | 0.61 | to | 0.62 |
| Beams, Thomas | 2 | 17 | to | 2 | 18 | 0.62 | to | 0.63 |
| Angles, Thomas, 4-in. and larger | 2 | 15 | to | 2 | 16 | 0.60 | to | 0.61 |
| Hoops and strip steel over 6-in. base | 3 | 15 | | | | 0.83 | | |
| Wire, plain, No. 8 | 5 | 5 | | | | 1.13 | | |
| Wire, barbed, 4-pt., No. 16, B.W.G. | 8 | 10 | | | | 1.87 | | |

# Machine Tool Trade Encouraged

## Orders of Firestone Tire & Rubber Co. and Ford Motor Co. and Increasing Number of Inquiries Stir Hopes

HOPES of the machine tool industry for a revival of buying early in 1932 have been stirred by a greater number of inquiries and some purchases of importance.

New equipment orders of the Ford Motor Co., mentioned a week ago, are likely to total several hundred thousand dollars.

The Ford company has bought 10 automatic welding machines, costing about $170,000, and 12 lathes, the latter having been divided among three or four makers, and about 20 shapers. Its orders for 27 milling machines, to cost about $75,000, are to be given out shortly.

The Firestone Tire & Rubber Co., Akron, Ohio, has placed orders for about $15,000 worth of presses.

Machine tool business has fallen to such a low point during the latter half of 1931 that the industry is encouraged to believe that the present low volume cannot continue very much longer. The interest that many manufacturers are now manifesting in new equipment may indicate that a larger volume of orders is merely awaiting the definite sign of a real turn in the general situation.

Some machine tool companies have fair-sized stocks of machines, which have been made partly to give employment to their men, but other companies have very low stocks. It is said that any marked gain in the volume of buying would be quickly reflected in production schedules of machine tool plants. Washington is now looked to for signs of restored confidence.

### New York

Although machine tool business in this market is still decidedly dull, there is encouragement in the fact that more inquiries are being received and also a few more orders. Both inquiries and orders cover single machines only, but, after a month or so in which manufacturers have taken almost no interest in machine tool requirements, even this sign of renewed activity is being made the most of.

### Cleveland

Seven punch presses, six small and one large machine, involving about $15,000, were bought the past week by the Firestone Tire & Rubber Co., Akron. Aside from this order purchases were light and limited mostly to single tools. Several metal-working shops in this territory have received orders from the Ford Motor Co. for parts and are expected to require some additional equipment when release of shipping orders is secured. There is some activity in the Detroit territory. The Ford company is reported to have purchased 12 lathes.

### New England

A few sales of fairly high-priced machine tools were made by dealers the past week. There was nothing to indicate a real buying movement, but general opinion in the trade is that business will pick up materially early in 1932. Most dealers are busy making quotations to prospective buyers, largely on high production equipment.

### Chicago

Tendencies in this market are still somewhat mixed. A few dealers believe that interest is slightly broader, though most sellers note no improvement. The gain in movement of used machinery, noted a week ago, is still in evidence. Farm implement manufacturers are making studies to reduce costs, but state they do not intend to buy new equipment this year. There is no word here as to the probability of lists to come from the railroads. Demand for small tools is holding recent gains, and there is complaint from users that dealers' stocks are inadequate to meet all requirements of prompt shipments.

### Pittsburgh

A few dealers in this district have had somewhat better orders thus far in the month than was the case in November. Most of them are small, and repair parts figure prominently. However, sentiment in the trade is better and inquiries are still encouraging. Many companies are asking for prices on tools and machinery for estimating purposes as they prepare schedules for next year, but in some cases dealers feel sure that actual orders will result early next year. On other prospective jobs, the trend of general business during January will be the deciding factor.

Sizable industrial and railroad lists are still lacking, but the Westinghouse Electric & Mfg. Co., East Pittsburgh, is planning to issue a list about Dec. 15, following a long period of inactivity.

### Milwaukee

Gratifying headway is being made by machine tool builders in getting prospective buyers of equipment to close orders on which inquiry has been put forth during the past few months. This is particularly true of the automotive industries, which apparently have been awaiting greater certainty concerning production schedules following the introduction of new models. Considerable activity is also expected among manufacturers of tractors, trailers, highway construction and maintenance machinery, snow plows, etc., as the result of the release of unusually heavy specifications following annual sessions of county boards of supervisors in Wisconsin and other Northern States. Railroad buying remains disappointing.

### Cincinnati

An Eastern school bought 10 small lathes the past week from a local builder and an automotive manufacturer placed an order for rebuilding two crankshaft lathes. Business of other machine tool manufacturers, however, showed no change. Inquiry has slackened and interest in equipment generally appears to become slower as the inventory period nears.

# 20 hours after and still cutting

Conclusive proof of the wonderful cutting and edge-holding qualities of SIMONDS RED STREAK HIGH SPEED STEEL HACK SAW BLADES is offered by a large user of power hack saws who recently made a test of a SIMONDS BLADE. This blade was in the cut continuously for over 20 hours, and when removed was still able to do a fair job of cutting. More than 230 cuts were made in various kinds of steel of different degrees of hardness. It was such conclusive evidence of SIMONDS quality that the user says: "In our experience we have not yet found a hack saw of any make that begins to give us the capacity and satisfaction that your high speed power blades do."

The blade used was a regular SIMONDS RED STREAK from stock and in no way special for the occasion . . .

A record of the test is given herewith:

Steel cut with 1" x 14" Red Streak High Speed Simonds Hack Saw.

| Cuts | Annealed High Speed |
|---|---|
| 25 | 1¾" rod |
| 4 | ¾" x 2" |
| 2 | 2½" rod |
| 5 | ½" x 2¾" |
| 1 | ½" x 2½" |
| 63 | ⅝" x ½" |
| 1 | ⅝" x 1¼" |
| 18 | ½" x 2½" |
| 25 | ⅝" x 1" |

| Cuts | Chrome-Nickel |
|---|---|
| 12 | 1" x 4" |
| 1 | ¾" x 3¼" |
| 6 | ½" x 3½" |

| Cuts | Round Machine Steel |
|---|---|
| 1 | 2" |
| 2 | ½" x 2¾" |

| Cuts | Cold Rolled Steel |
|---|---|
| 57 | ½" x 1¼" |

| Cuts | Mild |
|---|---|
| 6 | 1½" x 4" |
| 2 | 3¼" rods |

**YOU can get blades of the same high standard from your supply dealer.**

SIMONDS SAW AND STEEL CO.

*"The Saw Makers"*

ESTABLISHED 1832—FITCHBURG, MASS.

Chicago, Ill. Lockport, N. Y. Portland, Ore. Montreal, Que. Vancouver, B. C.
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New Orleans, La. London, England Seattle, Wash. Toronto, Ont.

# SIMONDS

## RED STREAK HIGH SPEED STEEL HACK SAW BLADES

## NEW YORK

**Gilbraltar Electric Clock Co., Inc.,** 64 Nassau Street, New York, Joseph Gottlieb, president, manufacturer of clocks and clock mechanisms, purchased buildings bounded by Communipaw and Bramhall Avenues, Van Horne and Woodward Streets, Jersey City, N. J., with 85,000 sq. ft. floor space, for new plant.

**New York Steam Corpn.,** 280 Madison Avenue, New York, has contract for furnishing steam for multi-story "Radio City" buildings, now under way, and will carry out extensions. Service to be furnished from six generating stations.

**General Steel Products Corpn.,** Bronx, New York, has been organized by Thomas F. Kearns, 253 East Kingsbridge Road, and Martin Pollack, 1695 Grand Avenue, to manufacture steel and metal goods.

**Bureau of Supplies and Accounts,** Navy Department, Washington, asks bids until Dec. 15 for three motor-driven radial drills for Brooklyn Navy Yard, one high potential testing set, quantity seamless steel tubing, and 24 copper-nickel-iron alloy valve castings; on same date, for one concrete mixer for yard at Lakehurst, N. J.

**Columbia Needle Guard Corpn.,** Brooklyn, has been organized by Charles Ciravolo, 1420 Fifty-ninth Street, and Morris Wiener, 974 Forty-fifth Street, to manufacture machine guards, etc.

**Shampan & Shampan,** 188 Montague Street, Brooklyn, architects, have plans for six-story industrial plant, 70 x 100 ft., at 731-37 Flushing Avenue. Cost about $300,000.

**Ex-Lax Mfg. Co.,** 431 Atlantic Avenue, Brooklyn, manufacturer of chemical products, has plans for six-story factory, 100 x 100 ft. Cost over $175,000 with equipment. Victor Mayper, 110 West Fortieth Street, New York, architect and engineer.

**American Carton Corpn.,** 160 John Street, Brooklyn, manufacturer of corrugated cartons and other containers, leased 30,000 sq. ft. floor space at 360 Furman Street for new plant.

**Higger Co.,** 1391 Flatbush Avenue, Brooklyn, manufacturer of electric signs and displays, leased two-story building at 2260 Bedford Avenue for expansion.

**H. M. Renken Dairy Co.,** 584 Myrtle Avenue, Brooklyn, let general contract to W. E. Anderson, 885 Flatbush Avenue, for two-story automobile service, repair and garage building.

**City Commission,** City Hall, New Brunswick, N. J., plans installation of electric-operated pumping machinery, daily capacity 4,000,000 gal., in connection with extensions in waterworks filter plant. Cost $300,000. Asher Atkinson is city engineer.

**Board of Education,** Carlstadt, N. J., plans installation of manual training department in two-story junior high school. Cost about $100,000. George Kentnor, supervising principal, in charge.

**Advance Products Corpn.,** 241-43 Cortlandt Street, Belleville, N. J., manufacturer of bathroom fixtures, plans rebuilding part of factory recently destroyed by fire. Loss over $40,000 with equipment. Building was occupied under lease.

**Chelva Heat, Inc.,** Newark, N. J., has leased space at 56-60 Earl Street for manufacture new type of electric radiators, including parts and assembling.

**Water Committee,** Board of Village Trustees, South Orange, N. J., asks bids until Dec. 18 for water pumping machinery, control apparatus, etc. Weston & Sampson, 14 Beacon Street, Boston, are consulting engineers. Ira T. Redfern, Village Hall, village engineer.

**Interstate Mechanical Products Corpn.,** Weehawken, N. J., care of Samuel J. Rawak, 261 Broadway, New York, representative, has been organized by Raymond L. O'Neil, Weehawken, and Henry D. Gellner, Palisades, N. J., to manufacture razor blades and kindred products.

**Thomas Leito,** Newark, N. J., has leased space at 97-99 Ferguson Street for motor truck parts and repair shop.

## NEW ENGLAND

**East Coast Ship & Yacht Corpn.,** New London, Conn., recently organized to take over ship and yacht building and repair plant of Noank Shipyard, Inc., plans several new one-story units, new marine railway, 2500-ton drydock with repair facilities, turntables, electric hoisting equipment, cranes, etc. Cost over $100,000.

**Boston Port Development Co.,** 1 Court Street, Boston, has approved plans for oil storage and distributing plant on 100-acre tract of marshland at Revere. In addition to main buildings and battery of 29 steel tanks, repair shop, automobile service and garage building and other operating units will be built. Cost over $2,500,000 with machinery.

**New England Power Association,** Worcester, Mass., purchased controlling interest in Green Mountain Power Corpn., operating at Montpelier, Barre, Burlington, Vt., and vicinity, for $1,025,000. Expansion and improvements are planned, including transmission lines.

**Auto Electric Sales & Service Co., Inc.,** 267 Park Street, New Haven, Conn., is asking bids on general contract for one-story service and repair plant. Brown & Von Beren, New Haven, architects.

**Daniels Machine & Die Co.,** Haverhill, Mass., has been organized by Nelson J. and H. M. Daniels, 26 Lamoille Avenue, to manufacture machinery and parts, dies, etc.

**Town River Oil Co.,** 36 Hill Street, Quincy Point, Quincy, Mass., let general contract to Chase & Roberts, Inc., Statler Building, Boston, for bulk oil storage and distributing plant. Cost over $45,000 with equipment.

**General Electric Co.,** Pittsfield, Mass., is arranging for expansion and improvements, including new buildings and equipment. Cost over $500,000 with machinery. Edward A. Wagner, general plant manager.

**Central Maine Power Co.,** Augusta, Me., is disposing of bond issue of $1,500,000, part of proceeds for extensions and improvements in plants and system.

**City Council,** Greenwich, Conn., is arranging bond issue of $40,000, approved at special election, for erection of equipment maintenance and repair building. S. E. Minor & Co., Greenwich, architects and engineers.

**Board of Trustees,** Monson State Hospital, Palmer, Mass., will soon begin erection of steam power plant for central heating. Cost over $100,000 with equipment. Edward C. Brown Co., 77 Summer Street, Boston, engineer.

## ST. LOUIS

**United States Engineer Office,** Kansas City, Mo., asks bids until Dec. 14 for one fuel oil storage tank, 38 ft. diameter and 25 ft. high; one steam pump and one power steam boiler.

**Board of Education,** Board of Education Building, St. Louis, plans manual training department in new three-story and basement high school, 400 x 500 ft., at Kingshighway and Arsenal Street. Bids asked on general contract early next year. Cost about $900,000. Architectural department in charge.

**Kansas City Power & Light Co.,** Kansas City, Mo., is disposing of bond issue of $3,000,000, part of fund for extensions and improvements in plants and system.

**Doniphan Hydro-Electric Co. and Current River Power Co.,** 1208 R. A. Long Building, Kansas City, Mo., will have hearing early in January on application for permission to build hydroelectric generating plants on Current River, near Doniphan, Mo. Project includes two developments. Cost over $500,000 with transmission lines.

**Forrest City Cotton Oil Co.,** Forrest City, Ark., operated by East St. Louis Cotton Oil Co., East St. Louis, Ill., contemplates rebuilding part of plant recently destroyed by fire. Loss over $85,000 including equipment.

**Common Council,** Oswego, Kan., plans municipal gas plant and system to cost $32,000. Bond issue is being arranged.

**Loose Wiles Biscuit Co.,** 1100 West Eighth Street, Kansas City, Mo., engaged Claud Beelman, Union Bank Building, Los Angeles, architect, to draw plans for plant at Los Angeles, with two main units, five stories and basement, 105 x 270 ft., and one story, 80 x 220 ft., with power house, machine shop and other departments. Cost over $1,000,000 with equipment.

**State Board of Regents,** Lincoln, Neb., let general contract to Busboom Brothers, Fairbury, Neb., for one-story and basement shop, 65 x 100 ft., at State School of Agriculture, Curtis, Neb. Cost about $30,000 with equipment. Meginnis & Schaumberg, Federal Trust Building, Lincoln, architects.

**Central West Public Service Co.,** Omaha, Neb., is arranging increase in capital by $10,000,000 preferred stock and 300,000 shares, no par value, part of proceeds to be used for extensions and improvements in plants and system.

**Pittsburg Boiler & Machine Co.** has changed its name to McNally-Pittsburg Mfg. Corpn., with general offices and works at Pittsburg, Kan., and sales offices at 205 Wacker Drive, Chicago.

## PHILADELPHIA

**Philadelphia Electric Co.,** Tenth and Chestnut Streets, Philadelphia, plans 1932 expansion and improvement program to cost $20,519,000, including additional power facilities, transmission lines, power substations and other construction.

**National Casket Co.,** 2041-43 Arch Street, Philadelphia, purchased local property for four-story and basement factory branch, storage and distributing plant of 40,000 sq. ft. floor space. Cost close to $85,000. Company headquarters at 60 Massachusetts Avenue, Boston.

**International Industries, Inc.,** Philadelphia, recently organized, leased floor at 54 North Seventh Street for manufacture of parts for talking machines and radios.

**Naval Aircraft Factory,** United States Navy Yard, Philadelphia, asks bids until Dec. 14 for revolution counter and timing equipment, electric-operated.

**Quaker City Chemical Co.,** 2736 North Broad Street, Philadelphia, manufacturer of industrial chemicals, has acquired building at Knoxville, Tenn., for branch plant. Will install tanks, vats, mechanical acid pumps and other machinery.

**Reading Co.,** Reading Terminal, Philadelphia, is arranging electrification and development program to cost $4,000,000. It includes electrification of passenger line to Norristown, cost $1,500,000; purchase of electric passenger cars, $1,500,000; conversion of present steam passenger cars into electric car trailers, $400,000, and locomotive rebuilding work at shops at Reading, Pa. Company also approved rebuilding of pier No. 11, Port Richmond, with installation of handling equipment, etc. Cost $150,000.

**W. E. Gochenaur Mfg. Co.,** 631 Arch Street, Philadelphia, manufacturer of marine equipment and supplies, leased space in building at 437-39 Arch Street for expansion.

**E. Kraushaar,** 1740 South Avondale Street, West Philadelphia, heads project to operate a quarry and plans purchase of two jar crushers and other equipment.

**Solfo Chemical Co.,** 821 Pennington Avenue, Trenton, N. J., manufacturer of industrial chemicals for metal-working industries, metallic paints, etc., has work under way on one-story addition to manufacturing department.

**Pottstown Borough School District,** Pottstown, Pa., asked new bids on general contract for one- and three-story senior and junior high school, and plans manual training department. Cost over $300,000. Hasness & Albright, Harrisburg, Pa., architects.

**C. E. Walsh,** purchasing agent, Pennsylvania Railroad Co., 15 North Thirty-second Street, Philadelphia, asks bids until Dec. 15 for quantity of steel wheels.

**Bureau of Supplies and Accounts,** Navy Department, Washington, asks bids until Dec. 15 for motor-driven testing machines for Philadelphia Navy Yard, and for five metal-clad switchgear units.

**Scranton School District,** Scranton, Pa., plans manual training department in new three-story school, for which bids will be asked on general contract early next year. Cost over $1,000,000. T. Williams, Scranton Life Building, architect and engineer.

## CINCINNATI

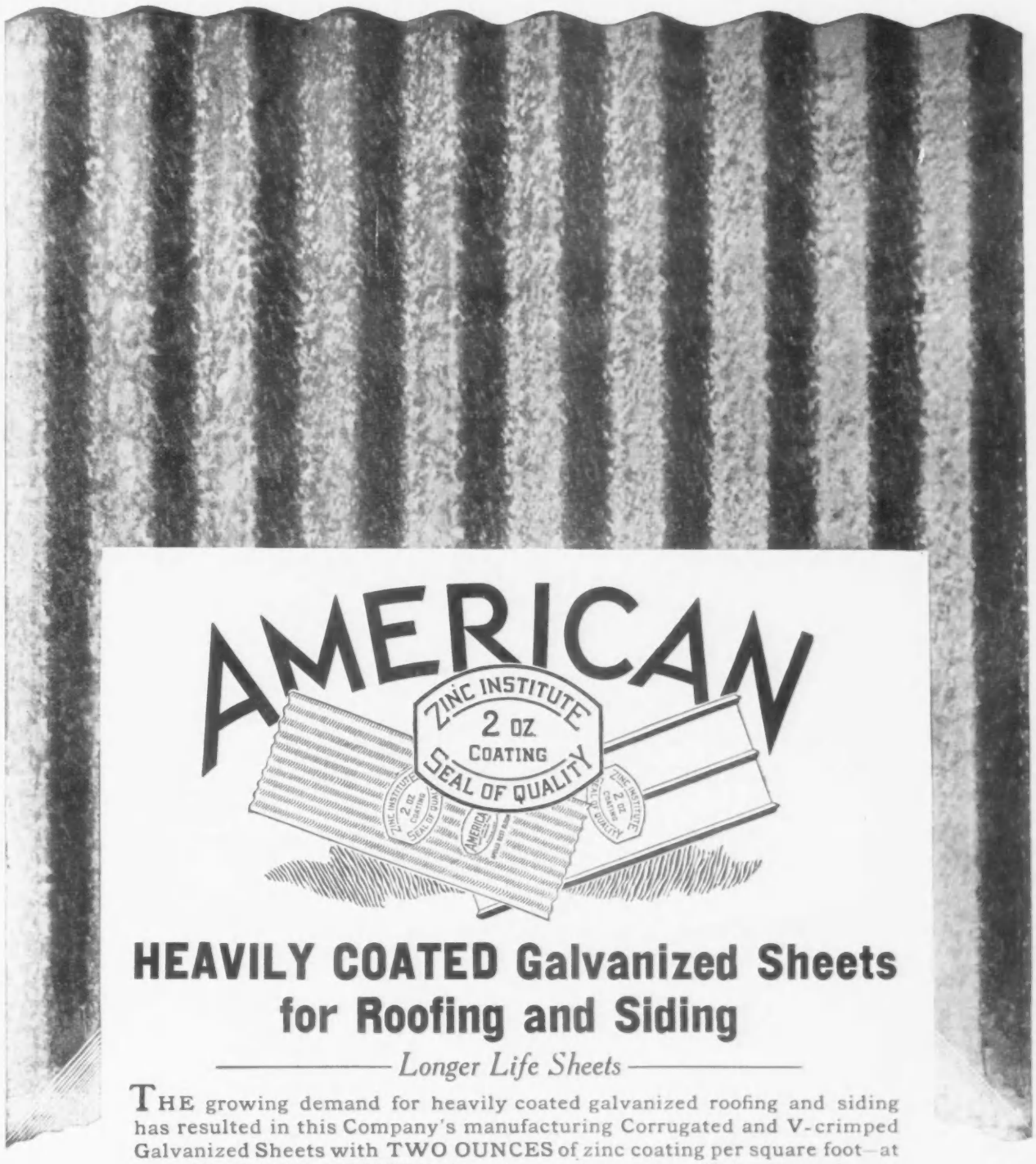
**Board of Trustees,** Ohio State University, Columbus, Ohio, has plans for three-story and basement engineering experiment station addition. Cost about $100,000 with equipment. Howard Dwight Smith, Brown Hall, University Campus, architect.

**Contracting Officer,** Wright Field, Dayton, Ohio, asks bids until Dec. 15 for 60 propeller blades and two master propeller blades; until Dec. 16 for quantity of aluminum rods, tubing, alloy rods, alloy tubing, etc.

**Reliable Safe & Lock Co.,** Covington, Ky., has arranged for production of line of double-hung steel windows and will increase capacity. New product will be marketed through Superior Metal Window Corpn., Covington.

**City Council,** Lawrenceburg, Ky., plans 150,000-gal. steel storage tank, two pumping units and other equipment installation in connection with extensions and improvements in municipal water system. Bond issue of $40,000 approved.

**Earl C. Henn,** 622 Broadway, Cincinnati, architect, has plans for abattoir and meat-packing plant near city, owner's name temporarily withheld, to include steam power

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THE growing demand for heavily coated galvanized roofing and siding has resulted in this Company's manufacturing Corrugated and V-crimped Galvanized Sheets with TWO OUNCES of zinc coating per square foot—at least TWO-THIRDS MORE than the regular grade. This means longer life for comparatively little extra cost.

DOUBLE ASSURANCE of protection and service may be had by the use of this new product, as all the sheets are branded with the American Zinc Institute's *"Seal of Quality"* and the well-known APOLLO Best Bloom brand. Furnished in No. 28 Gauge and heavier. Write for information and circular.

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AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL AND WIRE COMPANY
CARNEGIE STEEL COMPANY
COLUMBIA STEEL COMPANY
CYCLONE FENCE COMPANY
FEDERAL SHIPB'LDG. & DRY DOCK CO.
ILLINOIS STEEL COMPANY
MINNESOTA STEEL COMPANY
NATIONAL TUBE COMPANY
OIL WELL SUPPLY COMPANY
THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & RAILROAD CO.
UNIVERSAL ATLAS CEMENT COMPANY

*Pacific Coast Distributors*—Columbia Steel Company, Russ Building, San Francisco, Calif. *Export Distributors*—United States Steel Products Company, 30 Church Street, New York, N. Y.

house, cold storage and refrigerating department and other mechanical departments. Cost over $80,000 with equipment.

**Queen City Store Fixture Mfg. Co.,** Cincinnati, organized with $25,000 capital to take over and expand company of same name at 113 West Pearl Street, manufacturer of general store equipment and fixtures. Louis F. Britten and John C. McCarthy are principal incorporators.

**Warren Consolidated School District,** Rayland, Ohio, contemplates installation of manual training department in new three-story school at Tiltonville. Cost about $165,000. Bids asked on general contract. F. S. Rusk, 35 East Main Street, Columbus, Ohio, architect.

**Fisher Body Corpn.,** Memphis, Tenn., manufacturer of automobile bodies, resumed operations following curtailment since September, recalling about 1400 operatives on four-day week day and night schedule.

## SOUTH ATLANTIC

**McCormick Electric Sales Corpn.,** Baltimore, recently organized, will be headed by Willoughby M. McCormick, 400 Light Street, and will be affiliated with York Electric & Machine Co., York, Pa., manufacturer of lamp machinery, pumping equipment, etc., where production of electrical specialties will be carried out. H. G. Weist, secretary and treasurer of last noted company, will be vice-president of new organization.

**Fairfax Farms Dairy,** 1620 First Street, N. W., Washington, let general contract to A. D. Brown, 4400 Seventeenth Street, N. W., for two-story, electric-operated cold storage and refrigerating plant, 45 x 80 ft. Cost about $35,000 with machinery. Julius Wenig, Edmonds Building, architect.

**United States Engineer Office,** Navy Building, Washington, asks bids until Dec. 15 for one motor-driven automatic air compressor unit with accessories.

**Sun Oil Co.,** 1608 Walnut Street, Philadelphia, takes bids soon for bulk oil storage and distributing plant at Baltimore, with automobile service and garage unit.

**Trailer Co. of America, Inc.,** Thirty-first and Robertson Streets, Cincinnati, manufacturer of motor trailers, parts, etc., plans one-story factory branch, storage and maintenance plant at Charlotte, N. C.

**Bureau of Yards and Docks,** Navy Department, Washington, asks bids until Dec. 16 for surface condenser, motor-driven condensate pump, ventilating and air-cooling equipment, air ejector, electrical instruments and allied equipment for Brooklyn Navy Yard.

**Dixie Granite Co.,** Elberton, Ga., has plans for one-story finishing mill, 35 x 100 ft. Cost over $25,000 with machinery.

**Greensboro Coca-Cola Bottling Co.,** Greensboro, N. C., let general contract to G. W. Kane, Greensboro, for two-story and basement plant, 80 x 120 ft. Cost $85,000 with machinery. Pringle & Smith, Norris Building, Atlanta, Ga., architects.

**Ford Motor Co.,** Dearborn, Mich., plans one-story storage, distributing and service plant, 200 x 400 ft., with concrete dock and other structures on site on Potomac River, Alexandria, Va., recently acquired. Part of plant will be used for enameling division. Loading, conveying and other equipment will be installed. Cost over $100,000 with machinery.

**Georgia Power Co.,** Atlanta, Ga., will form construction and repair division for power stations, transmission lines, etc., discontinuing arrangement with Allied Engineers, Inc., Atlanta, heretofore carrying out such work for company.

**Uwharrie Cliff Mills,** Trinity, N. C., is considering installation of engine, boiler and auxiliary equipment for power service at plant.

**Bureau of Supplies and Accounts,** Navy Department, Washington, asks bids until Dec. 22 for turbine-driven generating equipment, condensers, air ejectors and spare parts for different navy yards, 18 ventilating sets and spare parts, three motor-driven buffer and polishing machines, polishing wheels, buffing wheels, circular steel wire scratch brushes, etc.

**Glenn L. Martin Co.,** Baltimore, has authorized five-day week at aircraft plant, replacing five and one-half day week, to allow for employment of additional workers during winter. Company has orders on hand for Government and other airplanes totaling over $1,000,000.

## GULF STATES

**Tex-York Utilities Corpn.,** recent purchaser of oil refinery of Sinclair Oil Co., Meraux, near New Orleans, does not have office in last named city, as incorrectly noted in these columns last week. Company lately organized under Delaware laws and is represented by Courtland Palmer, 26 Broadway, New York, attorney. Expansion and improvements to be carried out as previously stated. Cost over $5,000,000 with equipment.

**City Council,** Dallas, Tex., authorized purchase of property for enlargement of Love Field airport. Bonds were recently voted for $300,000 for land, buildings, equipment, etc.

**City Council,** Bay St. Louis, Miss., asks bids until Dec. 21 for stationary gasoline engine and other power equipment for municipal waterworks.

**City Council,** Starkville, Miss., will begin erection soon of municipal electric light and power plant and distributing system. Bids have been asked. Cost about $100,000 with equipment.

**Swift & Co.,** Union Stock Yards, Chicago, will have revised plans drawn for plant at Mobile, Ala. Cost about $85,000 with equipment.

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# Machinery Exports Lowest in More Than Eight Years

WASHINGTON, Dec. 4.—Exports of machinery from the United States in October declined to $20,184,000 from $24,715,000 in September. The heaviest slump was in industrial machinery, which fell almost 50 per cent to $7,991,000 from $14,690,000, according to the classification of the Division of Statistics, Department of Commerce. The October figure was the lowest for any month since February, 1923.

Imports of machinery, as listed in THE IRON AGE table, declined to $916,023 in October from $1,017,677 in September, and were only half the volume of a year earlier.

### Imports of Machinery into the United States

(By Value)

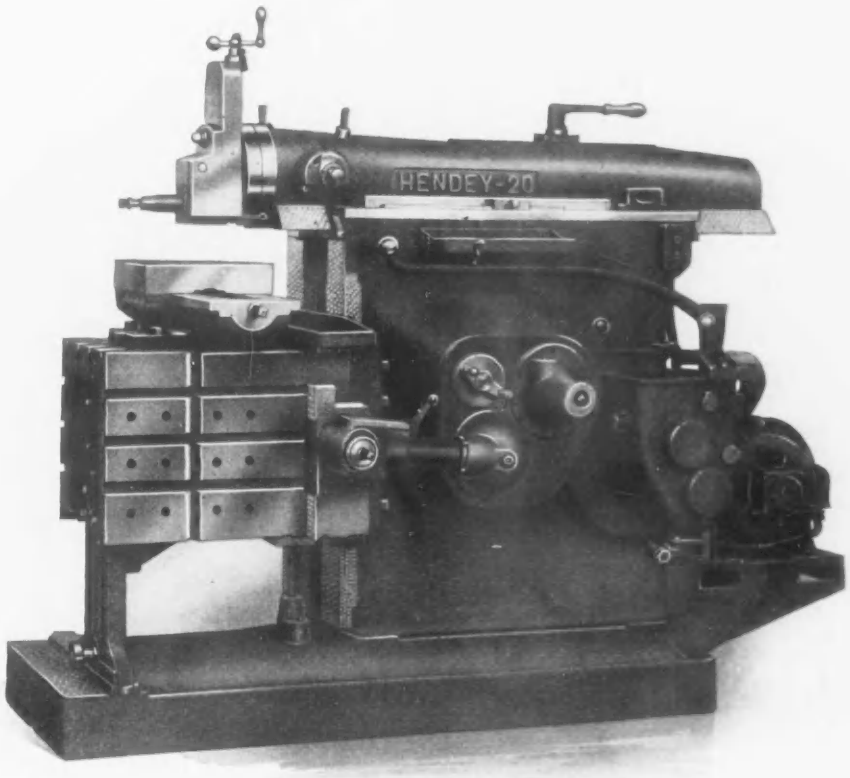
| | October | | Ten Months Ended October | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Metal-working machine tools | $10,521 | $42,978 | $211,068 | $843,166 |
| Agricultural machinery and implements | 81,168 | 338,463 | 3,011,999 | 8,208,960 |
| Electrical machinery | 285,716 | 312,814 | 2,365,331 | 2,321,276 |
| Other power-generating machinery | 27,873 | 46,992 | 274,521 | 502,814 |
| Other machinery | 420,857 | 963,719 | 4,231,266 | 7,543,584 |
| Vehicles, except agricultural | 89,888 | 132,312 | 2,322,912 | 2,143,673 |
| Total | $916,023 | $1,837,278 | $12,417,100 | $21,563,473 |

### Machinery Exports from the United States

(By Value in Thousands of Dollars)

| | October | | Ten Months Ended October | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Locomotives | $24 | $48 | $1,301 | $643 |
| Other steam engines | 49 | 13 | 183 | 421 |
| Boilers | 14 | 74 | 320 | 1,191 |
| Accessories and parts | 21 | 19 | 315 | 743 |
| Automobile engines | 148 | 106 | 2,185 | 5,431 |
| Other internal combustion engines | 369 | 421 | 3,752 | 7,195 |
| Accessories and parts | 130 | 219 | 1,897 | 2,990 |
| Electric locomotives | 12 | 88 | 587 | 879 |
| Other electric machinery and apparatus | 383 | 708 | 3,916 | 8,761 |
| Excavating machinery | 57 | 557 | 3,711 | 8,408 |
| Concrete mixers | 4 | 42 | 239 | 765 |
| Road-making machinery | 61 | 147 | 1,145 | 2,973 |
| Elevators and elevator machinery | 115 | 215 | 2,903 | 4,330 |
| Mining and quarrying machinery | 634 | 739 | 9,228 | 13,043 |
| Oil-well machinery | 433 | 951 | 9,862 | 21,761 |
| Pumps | 252 | 548 | 3,935 | 7,880 |
| Bending and power presses | 331 | 319 | 4,713 | 3,651 |
| Forging machinery | 107 | 58 | 3,446 | 1,699 |
| Machine tools | 921 | 1,443 | 23,893 | 21,313 |
| Other metal-working machinery and parts | 252 | 276 | 3,415 | 3,398 |
| Textile machinery | 671 | 761 | 5,710 | 7,530 |
| Sewing machines | 313 | 506 | 3,200 | 6,056 |
| Shoe machinery | 86 | 123 | 874 | 1,460 |
| Flour-mill and gristmill machinery | 11 | 71 | 228 | 415 |
| Sugar-mill machinery | 12 | 406 | 91 | 3,768 |
| Paper and pulp-mill machinery | 82 | 314 | 1,142 | 2,983 |
| Sawmill machinery | 23 | 33 | 486 | 618 |
| Other woodworking machinery | 59 | 143 | 817 | 1,557 |
| Refrigerating and ice-making machinery | 44 | 264 | 888 | 2,864 |
| Air compressors | 131 | 312 | 2,216 | 4,985 |
| Typewriters | 1,197 | 1,225 | 8,429 | 14,461 |
| Power laundry machinery | 114 | 78 | 726 | 1,189 |
| Typesetting machines | 99 | 338 | 2,001 | 3,326 |
| Printing presses | 123 | 298 | 1,840 | 4,483 |
| Agricultural machinery and implements | 899 | 3,417 | 55,709 | 100,693 |
| All other machinery and parts | 11,802 | 15,521 | 109,639 | 174,877 |
| Total | $20,184 | $30,801 | $274,940 | $448,740 |

# HENDEY CRANK SHAPERS




Embody fine workmanship—they are built by experienced mechanics and then tested and refined by expert inspectors.

The name HENDEY which is cast in the ram is a symbol of character.

It vouches for something superior to the average.

It begins with symmetry of design.

It controls balanced relationship of the different units to each other.

It inspires workmanship of a high order which produces a finished product that commands admiration from the men in the shop who come into intimate contact with the machine through its use.

Made in 16, 20, 24 and 32-inch stroke.

Bull gear runs in Timken roller bearings.

Driving mechanism and ramways automatically lubricated.

Speeds and feeds have simplified controls.

A Shaper capable of doing lots of dependable work in a quiet way.

## THE HENDEY MACHINE COMPANY

TORRINGTON, CONNECTICUT

**Mutual Benefit Ice Co.,** Monroe, La., is being organized by N. C. Stanfard, Monroe, to erect ice-manufacturing plant, equipment to be electric-operated. Cost over $80,000 with machinery.

**Jackson Parish School Board,** Jonesboro, La., plans manual training department in new high school at Hodges, La. Bids on general contract Dec. 31. Cost about $100,000. J. W. Smith & Associates, Ouachita National Bank Building, Monroe, La., architects.

**United States Engineer Office,** Jacksonville, Fla., asks bids until Dec. 14 for quantity of turnbuckle assemblies complete for hopper doors; until Dec. 15 for ball and socket joint.

**City Council,** Beaumont, Tex., has plans for new 12-airplane hangar with repair facilities at municipal airport, near Amelia, Tex., and for administration unit. Cost about $60,000 with equipment.

**Jefferson County Board of Commissioners,** Birmingham, plans installation of tanks, pumping equipment and other power machinery in connection with sewage disposal plant. Bids asked early in January. Cost about $225,000 with equipment. C. J. Rogers, Birmingham, County engineer.

**Humble Oil & Refining Co.,** Houston, Tex., has acquired 15-acre tract near Gladewater, Tex., and contemplates gasoline refinery, using casinghead gas from east Texas oilfields. Company is also considering new loading rack for storage and distributing unit. Cost over $100,000 with equipment.

**Rio Grande Valley Vegetable Co-operative Association,** Rio Hondo, Tex., G. R. Warren, in charge, approved erection of one-story packing plant, 45 x 145 ft., at Edinburg, Tex., with packing, conveying and other machinery. Cost about $45,000 with equipment.

## MILWAUKEE

**Milwaukee Department of Public Works,** City Hall, closes bids Dec. 22 for furnishing and installing one 60,000,000-gal. geared turbine centrifugal pump in Riverside pumping station. David McKeith is commissioner.

**Badger Printing Co.,** Appleton, Wis., has plans by LeVee & Gmeiner, architects, 601 West College Avenue, local, for new printing plant, 92 x 160 ft., two stories and basement. Cost $75,000 complete.

**Iroquois Foundry Co.,** Racine, Wis., manufacturer of malleable and gray iron castings, is installing brass and aluminum casting equipment. New department will be managed by Fred W. Busche, formerly with Prime Mfg. Co., Milwaukee, manufacturer of railroad supplies.

**C. H. & E. Mfg. Co.,** South First and East Mineral Streets, Milwaukee, manufacturer of pumps, hoists, mortar mixers, material elevators, etc., and Insley Mfg. Co., Indianapolis, manufacturer of concrete pouring towers, have withdrawn from National Equipment Corpn., Milwaukee, of which the late Philip A. Koehring was president. Other units are Koehring Corpn. and T. L. Smith Co., Milwaukee; Kwick-Mix Co., Port Washington, Wis., and Parsons Co., Newton, Iowa.

## BUFFALO

**New York State Electric & Gas Corpn.,** Ithaca, N. Y., plans extensions and improvements in artificial gas plants and system at Danville, Freeville and vicinity.

**State Commissioner of Correction,** State Office Building, Albany, N. Y., will build four mechanical shops in connection with new building at State prison, Attica, N. Y. General contract recently let to J. Weinstein Building Corp., 66 Court Street, Brooklyn, N. Y. Cost $1,640,000.

**Remington-Rand, Inc.,** Tonawanda, N. Y., plans increased output at steel filing cabinet manufacturing plant.

**Brown & Ide, Inc.,** Rochester, N. Y., organized by William O. Brown, 168 Rodessa Road, Charlotte Station, and Charles E. Ide, 96 Shady Way, to manufacture machinery and tools.

**Beebe Island Power Co.,** Watertown, N. Y., has work under way on hydro-electric generating plant on Black River, for service at paper mills in this vicinity. Will proceed with installation of machinery to have plant ready for service early next year. Cost about $600,000 with equipment.

**Pierce-Arrow Motor Car Co.,** 1695 Elmwood Avenue, Buffalo, is adding about 800 men to working force, making total operating quota of about 3000 employees; main plant running on 8-hr., 6-day week basis.

**Bureau of Supplies and Accounts,** Navy Department, Washington, asks bids until Dec. 15 for 220 aluminum alloy propeller blades for yard at Buffalo (Schedule 7053).

## PITTSBURGH

**Board of Public Education,** Administration Building, Pittsburgh, asks bids until Dec. 16 for steel shelving for Overbrook junior high school; shop power panels for Knoxville junior high school, insulated wire, etc. H. W. Cramblet, secretary.

**United Refining Co.,** Warren, Pa., plans rebuilding compressor plant destroyed by fire Dec. 1. Loss about $75,000 with machinery.

**National Electric Products Corpn.,** Fulton Building, Pittsburgh, manufacturer of electrical equipment, wire, etc., leased 20,000 sq. ft. in building at Philadelphia for factory branch, storage and distributing plant. Philadelphia offices are in Broad Street Station Building.

**Greenwood Commercial Refrigeration Co.,** Pittsburgh, organized by F. X. Holland, 230 Edward Avenue, Mount Lebanon, Pa., and A. R. Greenwood, 4760 Wallingford Street, Pittsburgh, to manufacture ice-making and refrigerating equipment.

**Columbia Gas & Electric Corpn.,** Charleston, W. Va., acquired 28,000 acres of oil and natural gas lands in Wayne County, W. Va., and Martin, Pike, Floyd and Lawrence counties, Ky., for about $1,500,000. Will develop and operate.

**Industrial Machine Co.,** 207 Twentieth Street, Huntington, W. Va., has been organized by W. K. Cowden and Nelson C. Black, capital $25,000, to operate general machine works and manufacture machinery and parts.

**Viking Metal Products Corpn.,** Ridgway, Pa., formerly of Jamestown, N. Y., recently completing factory at Ridgway costing over $150,000, resumes operations soon at plant, closed few weeks ago under direction of Daniel Dickerman, Ridgway, lately appointed receiver.

## CLEVELAND

**Patterson Foundry & Machine Co.,** East Liverpool, Ohio, has plans for steam-operated electric power plant and will begin work early next year. Cost about $75,000 with equipment.

**Premier-Duplex Vacuum Cleaner Co.,** Chester Avenue, Cleveland, manufacturer of vacuum cleaners and parts, plans expansion for Canadian manufacture and will lease space at Toronto.

**Union Wire & Iron Co.,** Cleveland, has been organized to take over and expand company of same name at 3407 Lakeside Street, manufacturer of iron and wire products. Hugh F. and William G. Taylor, principal incorporators.

**Dobeckum Co.,** 3301 Monroe Avenue, Cleveland, manufacturer of cellophane paper products, etc., filed plans for one-story addition. Cost about $25,000 with equipment. George S. Rider Co., Marshall Building, architect and engineer.

**White Motor Co.,** 842 East Seventy-ninth Street, Cleveland, authorized increased operations and full time schedule, giving employment to working force of about 3000 men. Company has secured order from Department of Sanitation, New York, for 774 heavy duty motor trucks, totaling about $2,600,000.

**Kinite Corpn.** has moved from Toledo, Ohio, to 1336 Speedway, Fairmont, W. Va.

## DETROIT

**Beryllium Development Corpn.,** 420 Lexington Avenue, New York, manufacturer of metallurgical products, leased former works of Buhl Aircraft Co., Marysville, Mich., for new branch plant. Buhl company recently removed to St. Clair, Mich., where production will be concentrated.

**Baker-Vawter Division of Remington-Rand Co.,** Benton Harbor, Mich., manufacturer of loose leaf devices and other office equipment, has acquired Kalamazoo Loose Leaf Binder Co., Kalamazoo, Mich. Latter company will be removed to Benton Harbor where manufacture will be concentrated. Headquarters of purchasing company are in Buffalo.

**Stinson Aircraft Corpn.,** Wayne, Mich., is considering one-story addition. Cost over $40,000 with equipment.

**Michigan Wire Die Co.,** Detroit, has been organized by Arthur W. Koch, 14867 Alma Avenue, and associates to manufacture steel wire drawing dies and kindred mechanical specialties.

**Ford Motor Co.,** Dearborn, Mich., contemplates using part of plant now in course of construction at Ypsilanti, Mich., for production of starters, generators and kindred appliances for Ford cars. Project includes hydroelectric power development. Cost over $500,000 with equipment.

**City Council,** North Muskegon, Mich., plans installation of electric-operated pumping machinery and other power equipment in connection with sewage system improvements. Cost about $60,000. Boulay Harrison Co., 914 Summit Street, Toledo, Ohio, engineer.

**Muskegon Gas Co.,** Muskegon, Mich., plans expansion and improvement program early in 1932 for pipe line work. Cost about $25,000.

**Chevrolet Motor Co.,** Detroit, is advancing production at all plants throughout country, with two shifts daily, four-day week. Working forces have been increased.

**Taylor-Detroit Mfg. Co.,** Adrian, Mich., manufacturer of caps for gasoline tanks and kindred automotive equipment, has been reorganized with Benjamin Taylor as president, succeeding Howard Taylor. Production will be resumed at once, following curtailment of about a month.

**Steel Strop, Inc.,** 4070 West Fort Street, Detroit, has been organized by Carl H. and Claus D. Lundblad, 5005 Whitfield Avenue, to manufacture patented sharpener for safety razor blades and other steel specialties.

**Warner Aircraft Corpn.,** 20263 Hoover Street, Detroit, manufacturer of airplanes and parts, is arranging for purchase of Aircraft Products Corpn., Melville Street, manufacturer of airplane parts and equipment, and will consolidate.

## CHICAGO

**Enameled Steel Sign Co.,** 320 East North Water Street, Chicago, manufacturer of steel signs and displays, leased four floors at 411-23 West Ontario Street, about 60,000 sq. ft., for new plant.

**Super-Power Co. of Illinois,** 20 North Wacker Drive, Chicago, affiliated with Commonwealth Edison Co., 72 West Adams Street, and allied interests, is disposing of bond issue of $2,500,000, part of proceeds to be used for steel tower transmission lines and other expansion.

**Tenak Products Co.,** 8 South Dearborn Street, Chicago, has been organized by Herbert Libberton and John R. Winterbotham to manufacture machinery and parts.

**Village Council,** Spring Valley, Minn., asks bids until Dec. 15 for three Diesel engine generating units and auxiliary equipment, power house and electrical distribution system for municipal service. John Osterud is village clerk.

**Paul O. Moratz,** Bloomington, Ill., plans installation of motors and other power equipment, wood-working machinery and accessories, in connection with rebuilding planing mill recently destroyed by fire.

**Continental Oil Co.,** Fort Dodge, Iowa, filed plans for bulk oil storage and distributing plant, capacity 418,000 gal., with pumping plant and other mechanical units. Cost over $70,000 with equipment.

**Northwestern Bell Telephone Co.,** Ninth and Douglas Streets, Sioux City, Iowa, leased one-story and basement building, 60 x 140 ft., to be erected by Coomer & Small, United Bank Building, for automobile service, repair and garage building.

**Bodine Electric Co.,** 2254 West Ohio Street, Chicago, manufacturer of electric motors, tool grinders, etc., filed plans for three-story addition, 72 x 121 ft. Cost over $65,000 with equipment. N. Ronnenberg, Inc., 10 South LaSalle Street, architect.

**United States Engineer Office,** St. Paul, Minn., asks bids (no closing date stated) for one-story power plant at Twin City locks, Minneapolis.

**Oliver H. Shoup,** Colorado Springs, Colo., heads project to build and operate oil refinery near Denver. Cost over $250,000 with machinery. Company will be organized.

**Bureau of Reclamation,** Denver, asks bids until Dec. 15 for two vertical motor-driven screw pumping units and accessories.

**Board of Education,** City Hall, Minneapolis, George F. Womrath, business superintendent, plans manual training department in new junior high school at Broadway and Fourth Street, N. E., three stories and basement, 200 x 275 ft. Bids to be asked on general contract soon. Cost about $500,000. Architectural Division, Bureau of Buildings, 811 N. E. Broadway, architect and engineer.

**Frank Foundries Corpn.,** Davenport, Iowa, will build pattern vault and shop, 50 x 91 ft.

# *An Invitation to* C. B's. *of* F. W.

ARE you a member of the ancient order of Critical Buyers of Flat Wire? If so, this invitation is for you.

We invite you to sample the satisfaction that thousands of C. B's. secure by simply turning their flat wire problems over to Roebling.

Making flat wire to meet *exacting* requirements is our specialty. Our flat wire plant [one of the country's largest] is organized—and our men are trained—to handle this type of business. We can give it the time and the painstaking care it deserves—and demands.

We are anxious to serve you and would welcome your inquiry. Roebling Flat Wire is made of cold-rolled high or low carbon steel, in various widths, thicknesses and finishes. We are especially well-equipped to make high carbon flats, tempered or untempered, in any finish, and are now serving many users who formerly found it necessary to import these wires.

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# ROEBLING FLAT WIRE

# Business as Others See It

Digest of Current Financial and Economic Opinion

LIGHT industries, so to speak—those catering to the ultimate consumer—are expected to outstrip the heavy or basic industries during the next few months. As Brookmire puts it: "People are obliged from time to time to replenish their supplies of clothing, tires and the like. . . . Heavy industries will do well on the whole to equal their performance of the past year."

On the general prospects, that organization sees good auguries and some which are not so good. Of the former is "the gradual correction of conditions which brought about the unprecedented decline in commodities." Cotton and wheat are in for declines in output and "certain other basic commodities, either through increase in demand or restriction of output, may be subject by spring to strengthening influences."

But—"There is little reason to anticipate much improvement on the demand side." European troubles will have a restraining influence; our exports will suffer from heavy competition; a general recovery in prices "cannot be looked forward to with complete confidence."

"A widespread revival of confidence and a much-improved business sentiment based upon several hopeful developments" is hailed by LaSalle Extension University. Four items are cited: Reversal in the direction of the gold movement; decrease in money in circulation; upward price movement in many commodities; signs of revival of activity among a large number of small and medium-sized businesses. And "a pick-up in business activity often comes first in these smaller" units.

Lines "nearest the consumer are making the best showing and selling their products more rapidly. Replacement demand is becoming of even greater predominance than at any time during the depression," according to the same source.

Several authorities mention the Wabash failure as something which may hit other roads if relief is not speedily forthcoming, through wage reductions or otherwise. In particular, Harvard Economic Society says it "emphasizes the weakened financial position of railroads."

That service thinks that "the most acute stage of the financial crisis has probably passed in the United States. But until there is a clearer prospect of restoration of financial stability in Europe, business recovery will remain difficult, both here and abroad."

Stability has not arrived, in the opinion of *Annalist*. And apprehension is felt at what Washington will bring forth. "It is not impossible that uncertainty as to just what Congress will do in the way of levying much needed heavier taxes, and in addition to that by way of experimental legislation affecting business, is exercising some measure of repressive influence, if it cannot be called clearly depressing."

We must narrow the spread between raw-material prices and finished goods, says Alexander Hamilton Institute, before general business will show improvement. And —"Barring the unexpected discovery of large quantities of gold, a long era of falling prices is in prospect." But "slowly declining price levels are anything but a bar to prosperity; in themselves they testify to the accumulation of wealth."

*Commerce and Finance* says "things are looking up." *Business Week* finds Germany and the railroads the "only formidable obstacles to stabilization and fundamental betterment of the outlook for business in this country."

National City Bank, New York, thinks that "the vicious circle of deflation" in bank loans and deposits can be reversed, "whenever business generally—now holding a waiting attitude—is satisfied that the time for an aggressive forward movement has come."

## INDIANA

**A. Johnson Forge & Machine Co.**, South Bend, let general contract to C. Vanden Borre, 319 South Center Street, Mishawaka, for one-story, sawtooth roof addition, 60 x 100 ft. Cost over $30,000 with equipment.

**Sunshine Greenhouse Mfg. Co.**, Indianapolis, organized by Fred W. and Fred C. W. Roesener, 1114 West Thirty-second Street, to manufacture metal greenhouses, greenhouse equipment, etc.

**Board of School Commissioners**, Connersville, plans manual training department in two-story and basement school. General contract let to Insley Mfg. Co., 801 North Olney Street, Indianapolis. Cost about $165,000. H. P. Bartlett, 6017 Lowell Avenue, Indianapolis, architect.

**Perfect Circle Co.**, Hagerstown, manufacturer of piston rings, is increasing production at all three plants, Hagerstown, Tipton and Newcastle. October was record month for company, showing gain of 71 per cent in sales over same month last year.

## PACIFIC COAST

**Ventura Union High School District**, Ventura, Cal., asks bids until Dec. 14 for mechanical blower system for vocational training shop now in course of erection. John C. Austin and Frederic M. Ashley, Chamber of Commerce Building, Los Angeles, architects.

**Riverside Fruit Co.**, Riverside Cal., leased one-story and basement building, 80 x 150 ft., to be built by Union Pacific Railroad Co. at 5260 Magnolia Avenue, Riverside, for packing plant. Installation includes packing machinery, conveying and other equipment. Cost about $60,000.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Dec. 15 for 400 pneumatic rivet-sets for Puget Sound Navy Yard, Wash.

**Commercial Boiler Works**, Atlantic Street and East Marginal Way, Seattle, and Draper Engine Works, same address, manufacturer fire engines, plan rebuilding of part of plants recently destroyed by fire. Combined loss over $100,000 with equipment.

**Fire Control Corpn.**, 8342 Twenty-first Avenue, N. W., Seattle, manufacturer of fire-fighting equipment, plans two-story factory, 40 x 65 ft., at Ballard. Cost about $25,000 with machinery.

**Bureau of Reclamation**, Denver, asks bids until Dec. 30 for construction of power plant, power canal and improvements in power dam, Kennewick Division, Yakima project, near Prosser, Wash., including 49,300 lb. gates and gate lifts, 28,000 lb. miscellaneous steel and metal work, etc.

**Eggert & Petterson**, 207 North Front Street, San Pedro, Los Angeles, has been organized by W. H. Eggert, 619 West Eleventh Street, and Oscar Petterson to manufacture propellers and kindred aircraft equipment and operate general machine works.

**Lockheed Aircraft Co.**, Burbank, Cal., is being reorganized and will discontinue identification with Detroit Aircraft Corpn., Detroit, following recent receivership. Production of parts and assembling will be concentrated at Burbank.

**Board of County Commissioners**, Las Vegas, Nev., William L. Scott, clerk, asks bids until Jan. 5 for one motor road grader, four or six cylinder, front type scarifier with blade not less than 12 ft.

**Hydraulic Precision Lathe Co.**, Seattle, care of James E. Bradford, 1108 Smith Tower Building, representative, has been organized by Leo F. Collins and Wesley Langer, capital $50,000, to manufacture hydraulic screw cutting precision control devices and lathe equipment.

## FOREIGN

**Santiago Gas Co.**, Santiago, Chile, contemplates plant for production of metallurgical coke and coal distillation plant with by-products units. Cost over $400,000.

**British Xylonite Co.**, London, England, manufacturer of brushes, plans erection of plant near Melbourne, Australia. Cost over $50,000 with machinery.

**Société Anonyme des Etablissement J. J. Carnard et Forges de Basse Indre**, Rue de Surene, Paris, France, manufacturer of tin containers and other tinplate products, has arranged with Continental Can Co., 1 Pershing Square, New York, for production of machinery under Continental patents, also cans and containers. Development program is planned. Continental company has disposed of interest heretofore held in Campagnie Franco-Continentale de Boites Metalliques, Paris, manufacturer of kindred products.

**British Broadcasting Co.**, London, England, plans short-wave broadcasting station, with power station and other equipment, for broadcasting through entire British Empire.

**Soviet Russian Government**, Moscow, approved plans for new works at Samara, for manufacture of carburetors and kindred products for automobiles, tractor and aircraft industries. Cost about 20,000,000 rubles ($10,000,000) with equipment. It is scheduled for completion next June. Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

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**Shenango-Penn Mold Co.**, Dover, Ohio, has removed the office of its Philadelphia sales representative, Adair-Day Corpn., to 1018 Girard Trust Co. Building.